Hydrogen Draft Solicitation Concepts Workshop

August 13, 2015

10:00 a.m. – 4:30 p.m.

August 14, 2015

9:00 a.m. – 4:00 p.m.

Introduction

CATHERINE DUNWOODY

Agenda Overview and Expectations

JIM MCKINNEY

Workshop Objective

To provide a forum to discuss the Draft Solicitation Concepts for the Hydrogen Refueling Infrastructure.

August 13, 2015

- **10:00 - 10:20 a.m.**

  Introductions, agenda, overview

- **10:20 – Noon**

  California Hydrogen Infrastructure Tool (CHIT), California Hydrogen Assessment Tool (CHAT) an Overview and Demonstration

- **Noon - 1:30 p.m.**

  Lunch break

August 13, 2015

- **1:30 - 2:30 p.m.**

  Funding, eligible projects, application requirements

- **2:30 - 2:45 p.m.**

  Break

- **2:45 - 3:40 p.m.**

  Hydrogen quality, dispenser accuracy, fueling, dual dispenser

- **3:40 - 4:00 p.m.**

  Mobile refueling, point of sale, and on-line reporting

- **4:00 – 4:30 p.m.**

  Day 1 Wrap-up and public discussion

August 14, 2015

- **9:00 - 11:00 a.m.**

  Application submittal, screening and scoring

- **11:00 – 11:15 a.m.**

  Break

- **11:15 – Noon**

  Renewable hydrogen, CEQA, permitting, station locations, and milestones

- **Noon - 1:30 p.m.**

  Lunch break

August 14, 2015

- **1:30 - 2:30 p.m.**

  Hydrogen quality/purity, type certification

- **2:30 - 2:45 p.m.**

  Break

- **2:45 - 4:00 p.m.**

  Day 2 Wrap-up and public discussion

Commitment to Diversity

The Energy Commission adopted a resolution on April 8, 2015, to firmly commit to:

- Increase participation of women, minority, disabled veteran and LGBT business enterprises in program funding opportunities
- Increase outreach and participation by disadvantaged communities
- Increase diversity in participation at Energy Commission proceedings
- Increase diversity in employment and promotional opportunities

Commitment to Diversity

- **Fairness –** Increase funding accessibility to all Californians.
- **Inclusion –** Small businesses make up a significant portion of the U.S. economy.
- **Job Creation –** Projects can create jobs for residents of the under-served communities.
- **Diversity of Ideas –** Great ideas occur in a variety of areas.
- **Diversity in Communities' Needs –** Needs vary widely from one area to the next (air quality, socioeconomic, etc.).

California Hydrogen Infrastructure Tool (CHIT) and
California Hydrogen Assessment Tool (CHAT)

ANDREW MARTINEZ

CHIT/CHAT

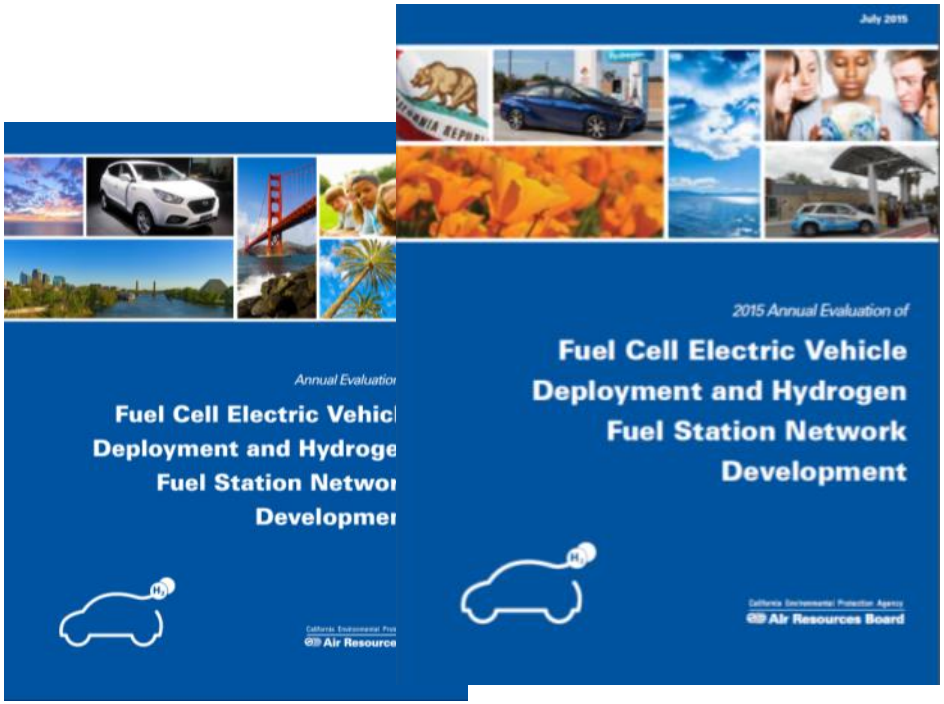
- Analysis Process and Current Network Status
- Priority Areas Overview
- Analysis Method to Identify Priority Areas
- Location-Based Scoring Concepts
- Priority Area Maps
- Discussion

ANALYSIS PROCESS AND CURRENT NETWORK STATUS

Analysis for AB 8

- ARB annually reports to Energy Commission by 6/30
  - Current and projected FCEV fleet and station progress
  - Assessment of coverage and capacity
  - Recommended station placement
  - Recommended funding level (up to $20M)
  - Recommended station technical specifications

Reports available at:
http://www.arb.ca.gov/hydrogen



Reports available at:
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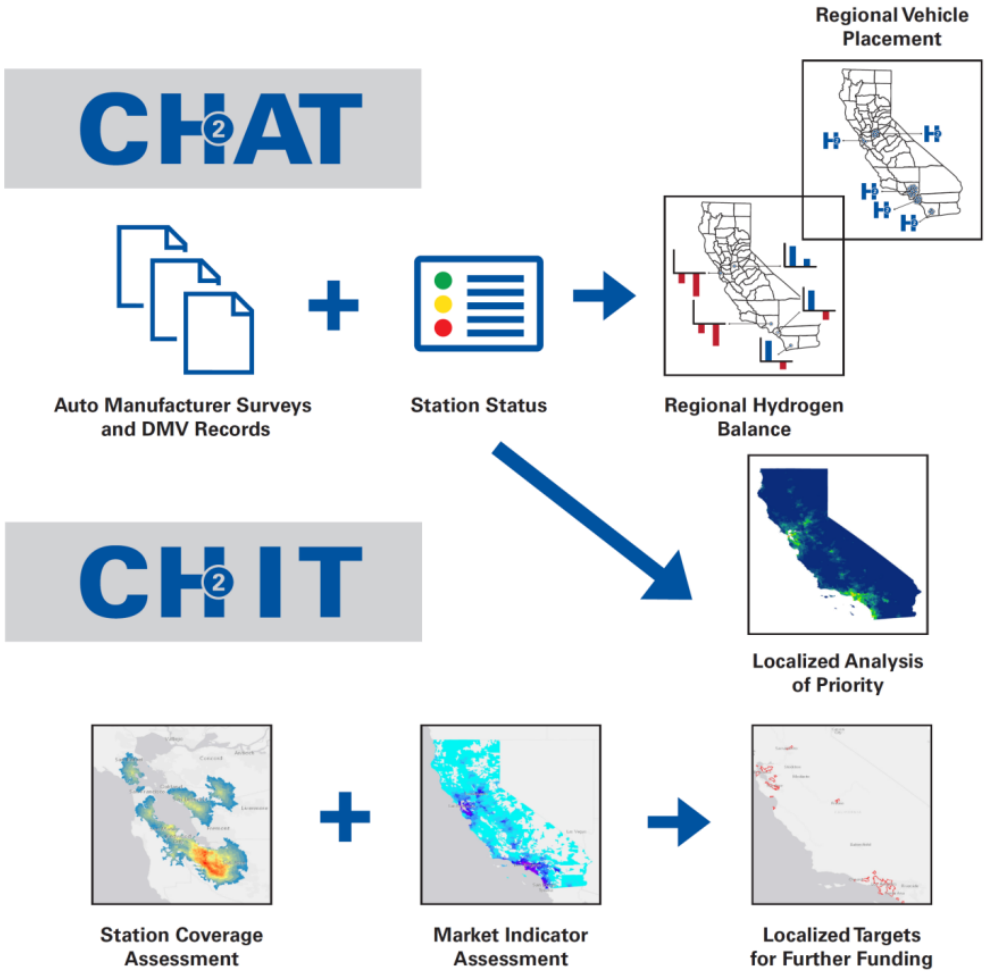
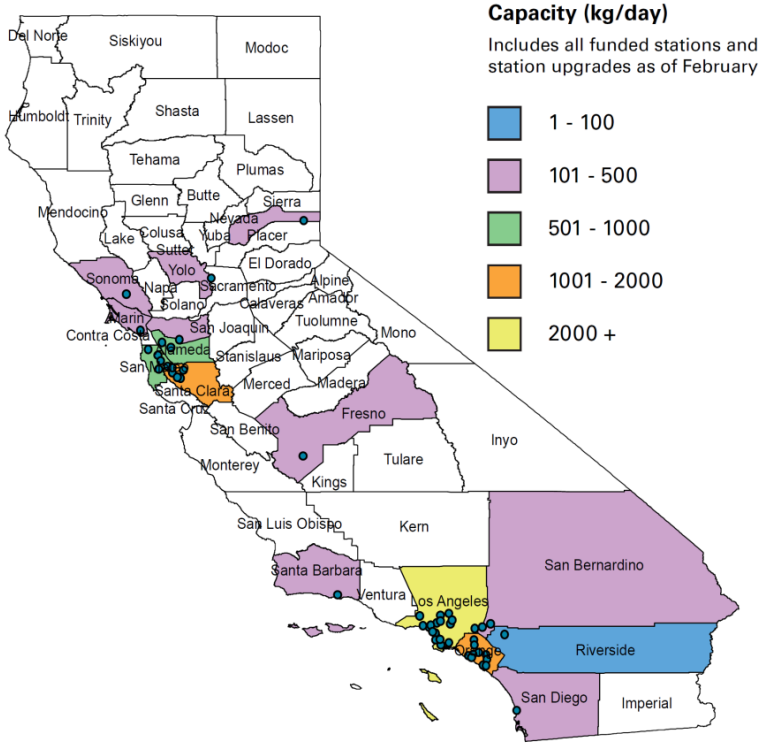
Analysis Process



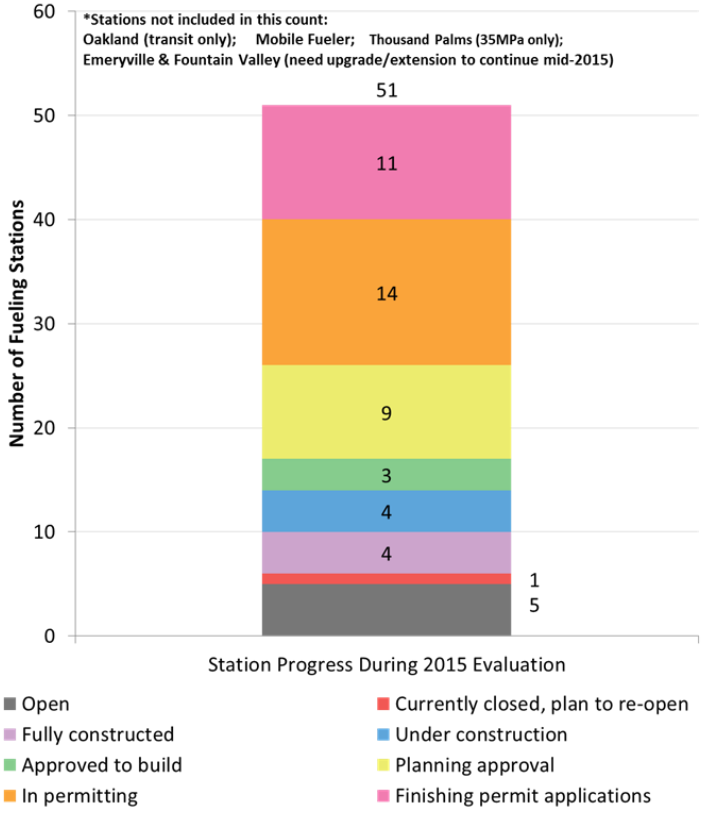
- CHAT allows analysis of current status and industry data mandated by AB 8
- CHIT considers additional information and performs analysis to answer questions relevant to network planning

Network Status



Network Status

As of June 1, 2015:



Source: CEC and GO-Biz

PRIORITY AREAS OVERVIEW

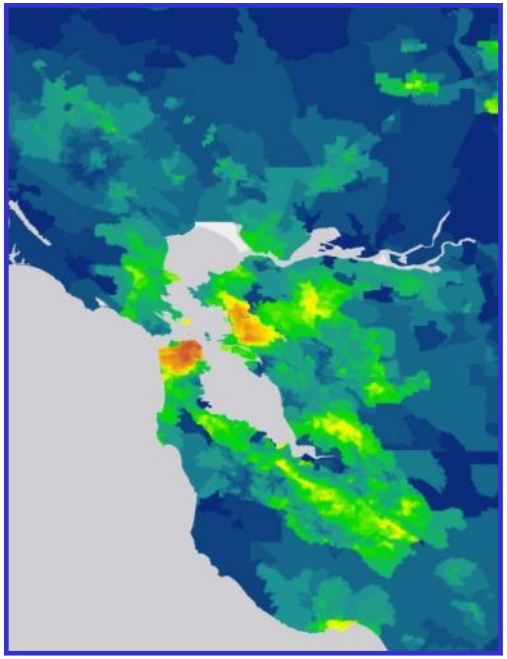
Priority Areas Identified for Further Funding

In order to provide coverage to the most likely areas of early market adoption, San Francisco, Berkeley, San Diego, Greater Los Angeles, Torrance, and other areas with a high market potential should receive priority. Stations in Lebec and Los Banos are needed to strengthen the planned connector on I-5 in Coalinga.

Priority Areas	Max. Stations Funded	Purpose
San Francisco	2	Establish Core Market
Berkeley/Oakland/Walnut Creek/Pleasant Hill	2	Establish Core Market
San Diego/La Mesa	1	Expand Core Market Coverage
South San Diego/Coronado	1	Expand Core Market Coverage
Pasadena/San Gabriel/Arcadia	1	Expand Core Market Coverage
Long Beach/Huntington Beach/Buena Park/Fullerton	1	Expand Core Market Coverage
Sacramento/Land Park	1	Expand Core Market Coverage
Sacramento/Carmichael	1	Expand Core Market Coverage
Greater Los Angeles/Sherman Oaks/Granada Hills/Glendale	1	Expand Core Market Capacity
Torrance/Palos Verdes/Manhattan Beach/Redondo Beach	1	Expand Core Market Capacity
Santa Cruz	1	Initiate Future Market
Fremont	1	Initiate Future Market
Thousand Oaks	1	Initiate Future Market
Encinitas/Carlsbad	1	Initiate Future Market
Lebec	1	Develop Connector
Los Banos	1	Develop Connector
Camp Pendleton	1	Develop Connector

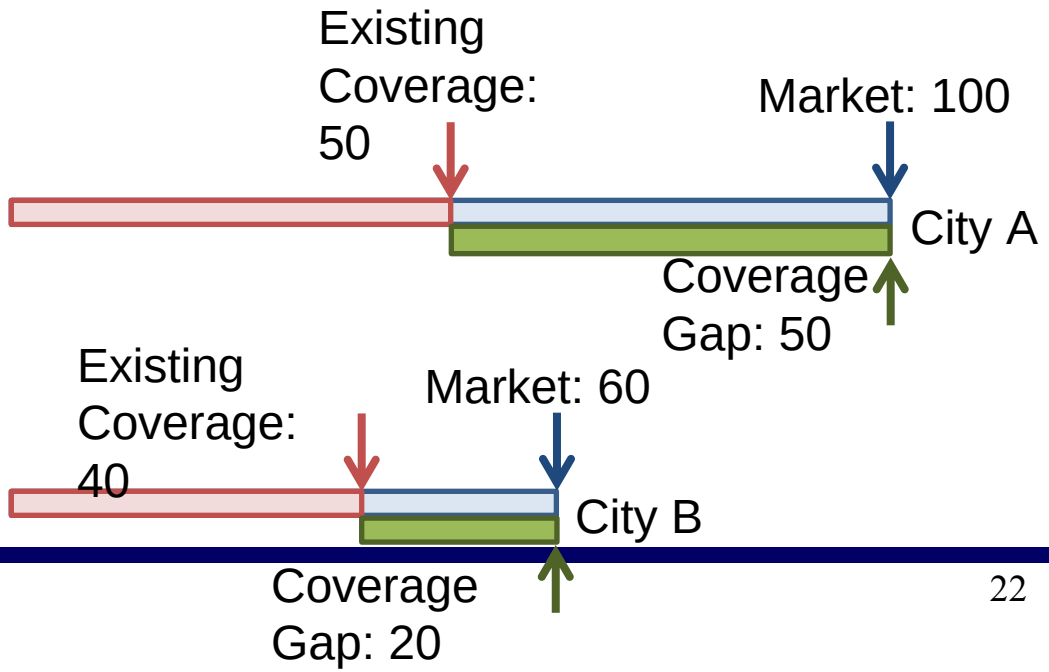
ANALYSIS METHOD TO IDENTIFY PRIORITY AREAS

Identifying Priority Areas

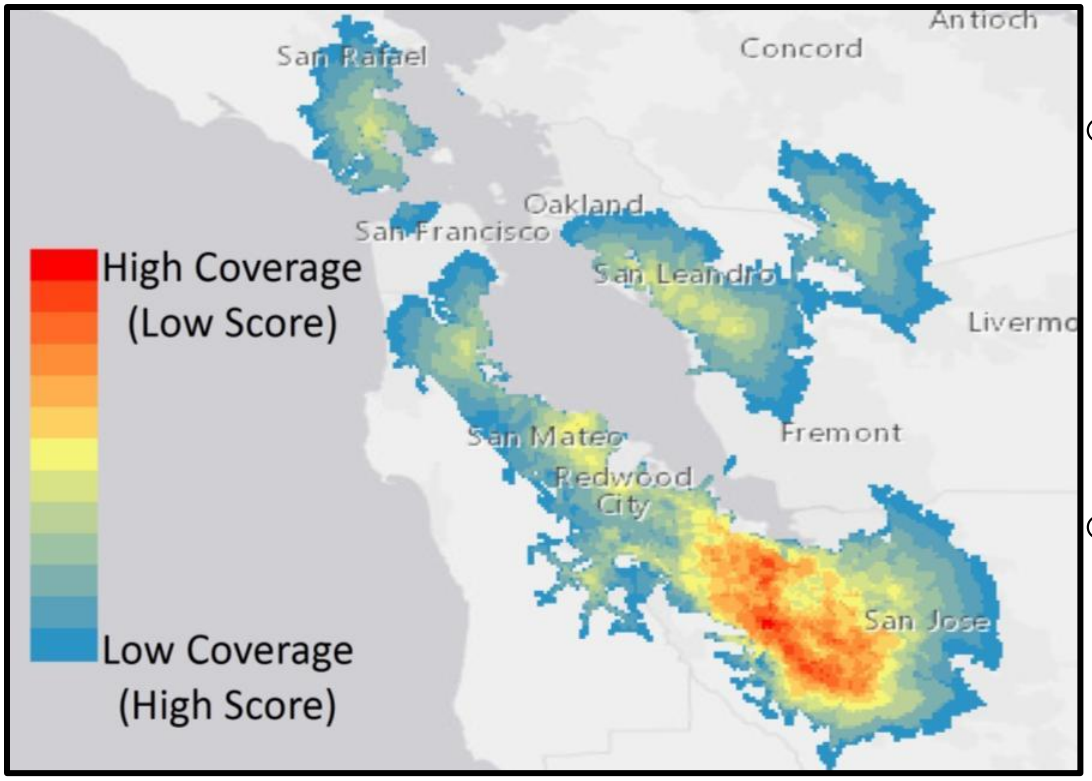


GIS Network Analysis and Station Area Planning

- **CHIT is a <u>planning</u> tool intended to provide general direction indicating areas of needed infrastructure**
- **CHIT evaluates <u>relative</u> need for hydrogen infrastructure based on a gap analysis between a projected market and current infrastructure**



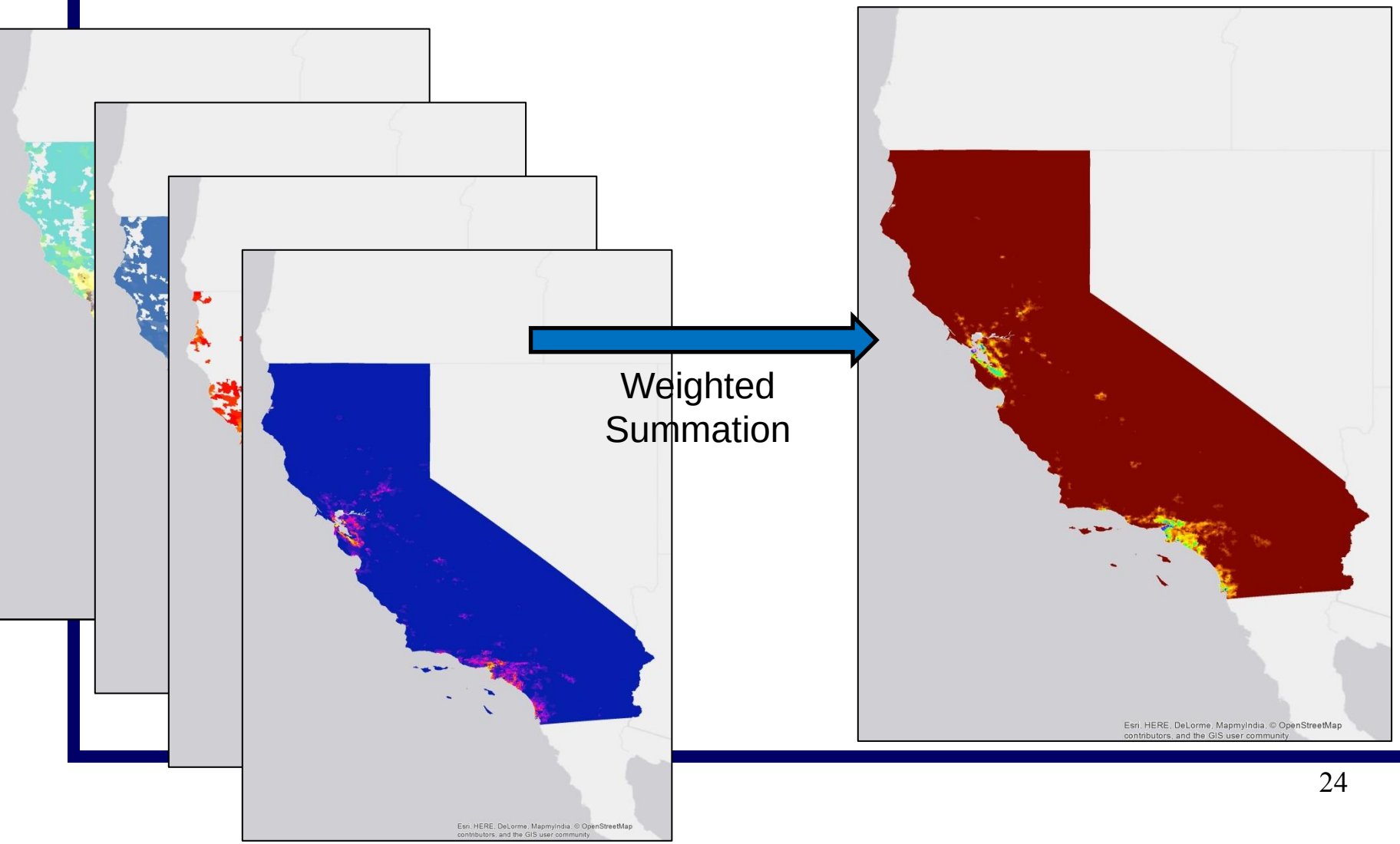
Identifying Priority Areas



- Estimates combined coverage provided by multiple stations that may be reachable within various drive times
- Utilizes internal ARB model data of on-the-road travel speeds at peak times

*Areas without coverage have no color and score highest

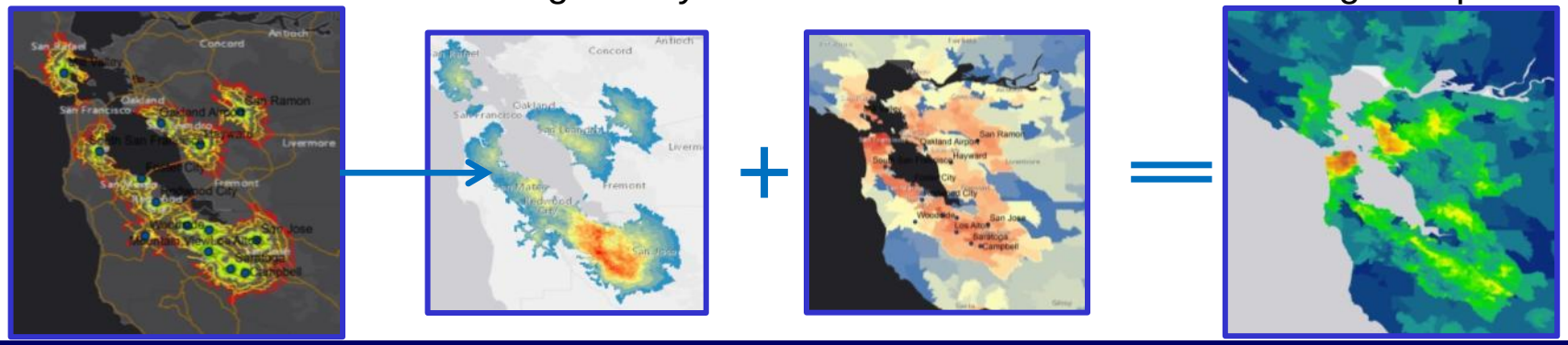
Identifying Priority Areas



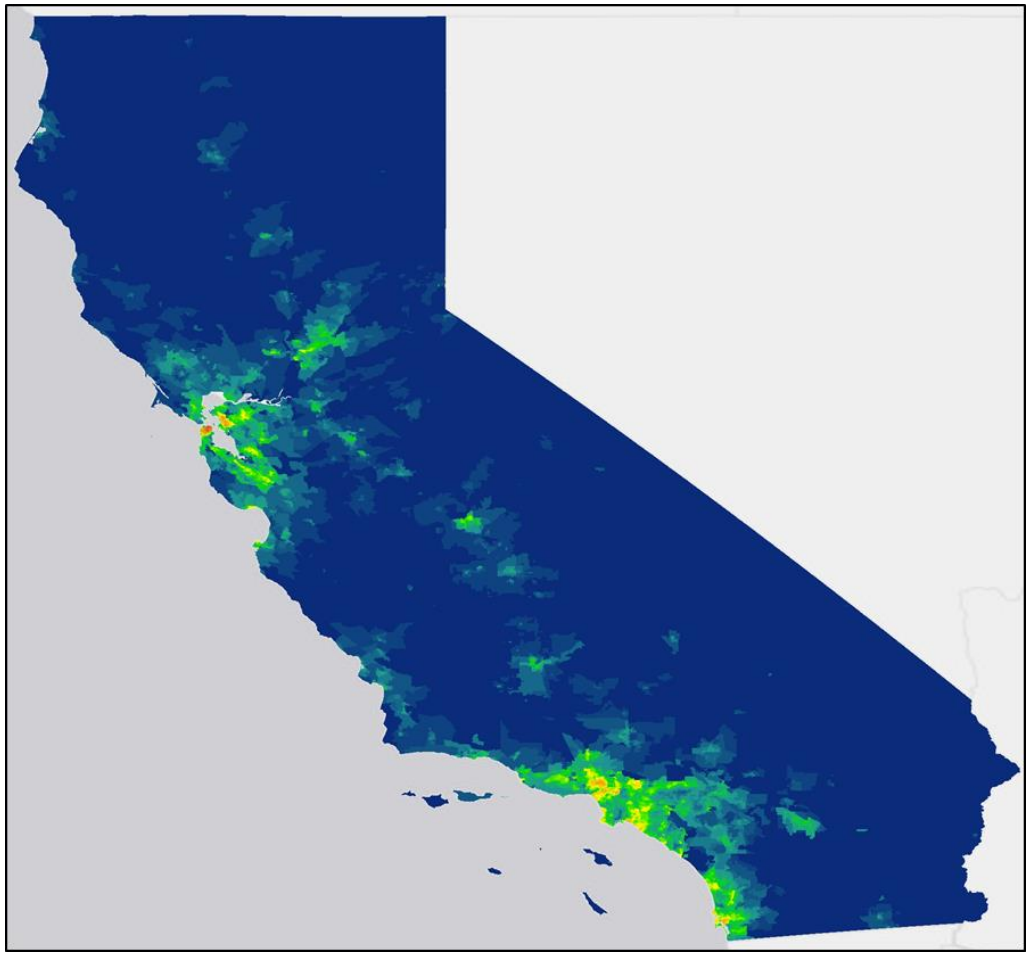
Identifying Priority Areas

- Compares evaluation of market and coverage to determine gaps
- Enables separate identification of market potential and areas of greatest coverage and capacity needs
- Enables annual dynamic evaluation to adjust planning as deployment progresses

Drive Time Calculations Coverage Analysis Market Assessment Coverage Gap



AB8 Report Coverage Gap Assessment



Gap ~ Coverage, Market

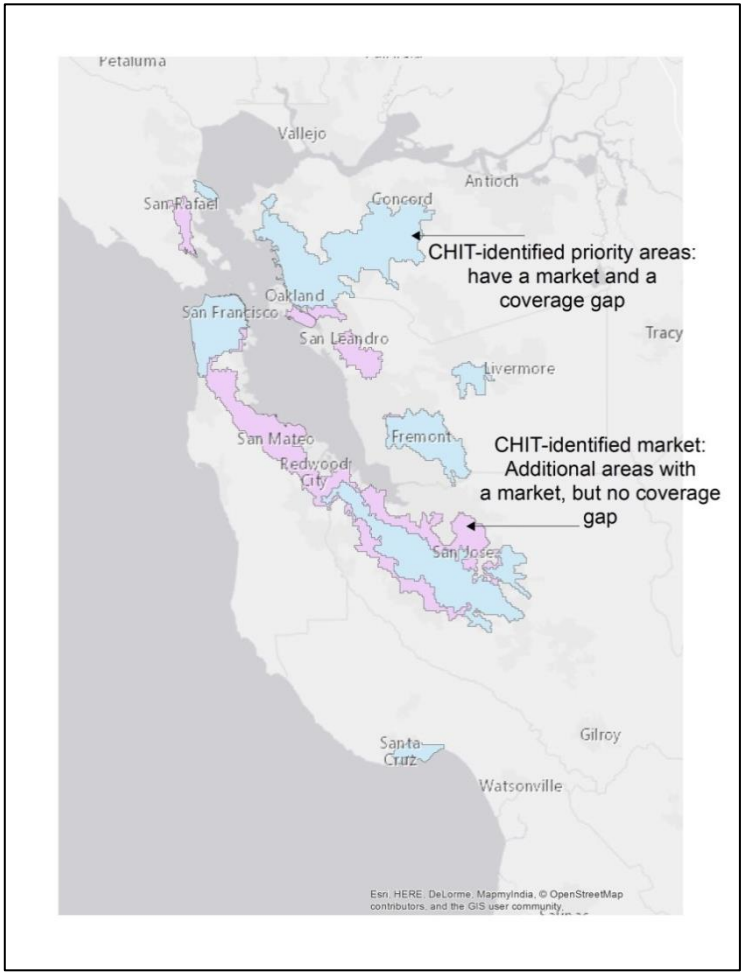
Coverage ~ Existing, Potential

Market ~ Financial, Green Vehicle Adoption, Education

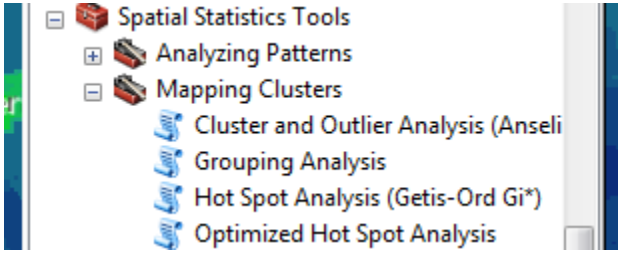
Financial ~ Income, Vehicle Make, MSRP

Identifying Priority Areas

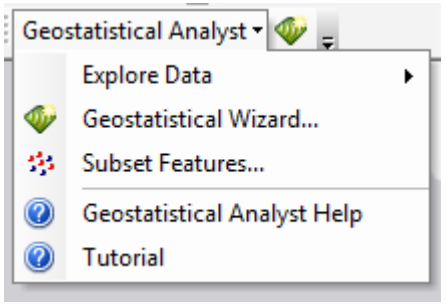
- Capacity requirements account for priority areas with coverage gap and areas with high market potential but currently sufficient coverage
- Existing station capacities count as meeting needs in any area when sufficiently close
- Capacity needs determined by distributing statewide vehicle counts from CHAT among all market areas and assuming average vehicle fuel consumption



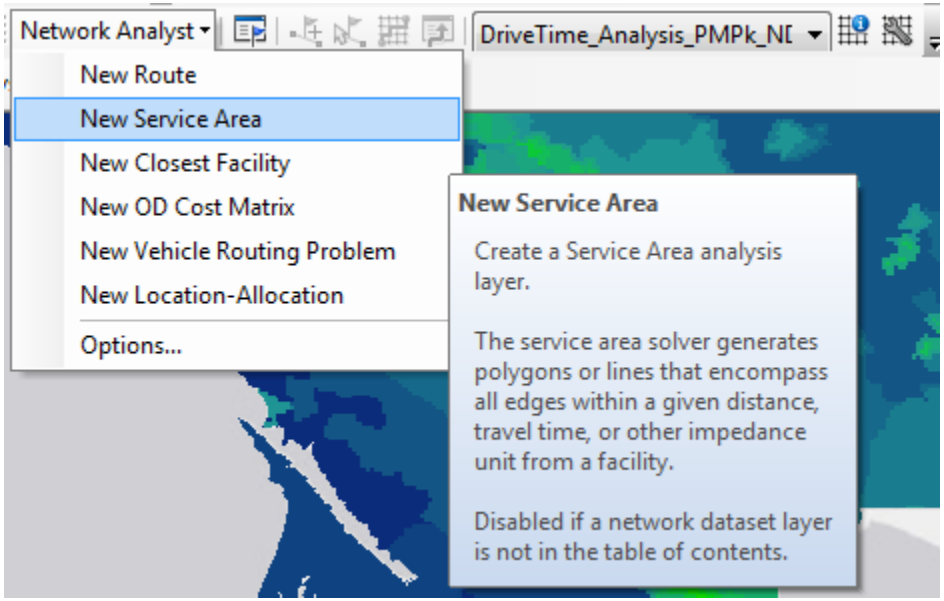
Built-In ArcGIS Tools Utilized

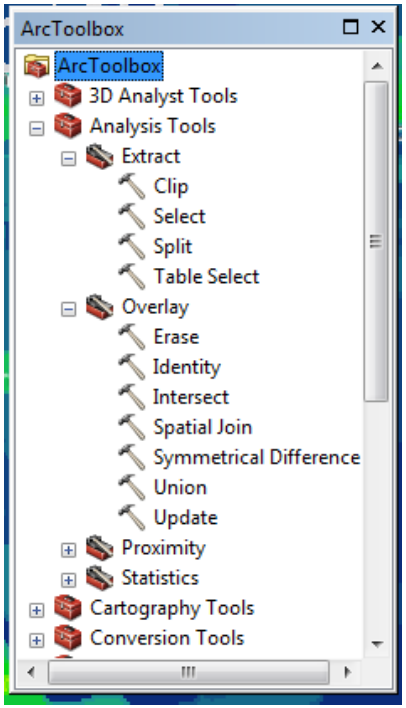


Input data exploration and validation



Results analysis

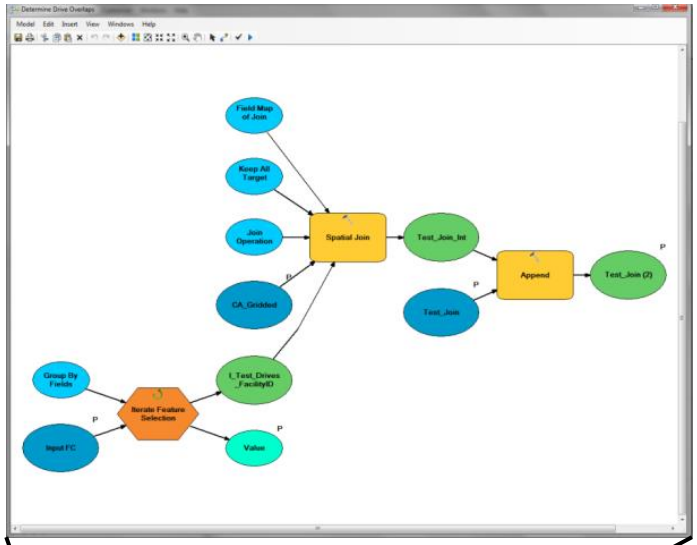




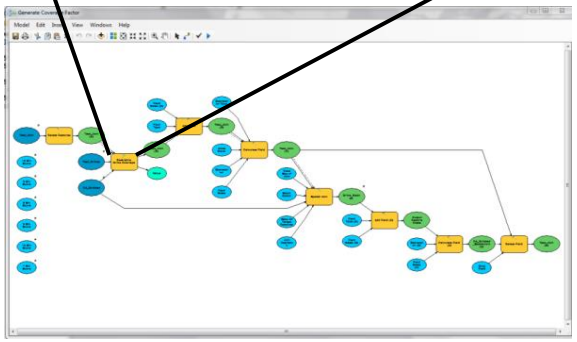
Analysis relies heavily on spatial overlays and correlations

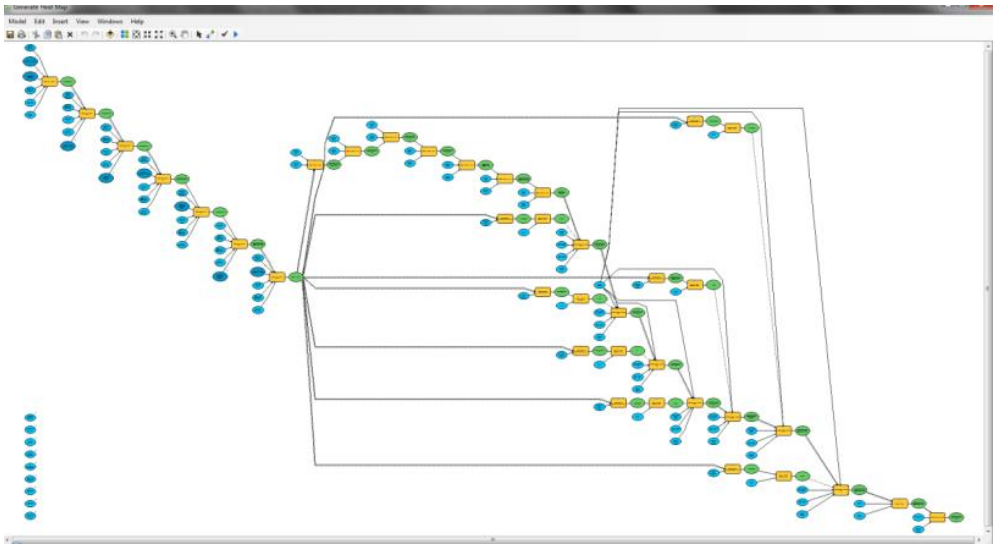
New Service Area: Determination of coverage provided by existing, funded, and potential stations

Custom/Automated ArcGIS Tools



- CHIT_Tools.tbx
  - Determine Drive Overlaps
  - Determine Station Counts 2-Factor Match
  - Determine Station Counts 3-Factor Match
  - Determine Station Counts 6-Factor Match
  - Filter Priorities by Area
  - Finalize Priorities
  - Generate Coverage Factor
  - Generate Heat Map
  - Prioritize Heat Map Areas
  - Reorder Priorities
  - Statistical Hot Spots





STATION COMPETITION AND STATION PRIORITY AREA DETERMINATION

Application Coverage Gap Values

- ARB will supply coverage gap values to applicants during proposal preparation
- ARB coverage gap value is a general indication of relative score
- ARB coverage gap values WILL NOT be identical to CEC-evaluated coverage gap scores used in final evaluation
- Values will be given on first-come, first-served basis
- Please verify accuracy of full address including full zip code in order to receive the most accurate location value

Contact for Values:
Andrew Martinez, PhD
(916) 322-8449
Andrew.martinez@arb.ca.gov

Application Capacity Values

- Capacity values will also be provided by ARB along with coverage gap values
- Capacity values serve as general indication of match between proposed station capacity and projected need in Priority Area containing proposed location
- For stations outside Priority Areas, alternate methods may be utilized, such as nearest Priority Area needs or extrapolated needs for capacity
- ARB capacity values WILL NOT be identical to CEC-evaluated capacity scores used in final evaluation

Projected Capacity Gaps in Priority Areas

- Calculated on basis of projected need in 2021
- Capacity gap projections not determined for connector stations

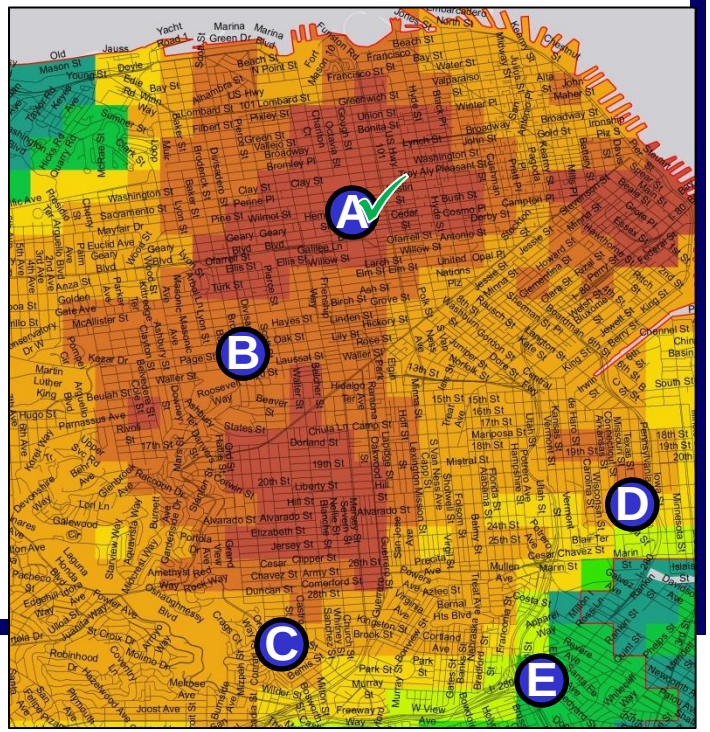
Area	Capacity Need (kg/day)
San Francisco	2070
Berkeley/Oakland/Walnut Creek/ Pleasant Hill	1120
San Diego/La Mesa	990
Greater Los Angeles/Sherman Oaks/Granada Hills/Glendale	1700
South San Diego/Coronado	320
Torrance/Palos Verdes/Manhattan Beach/Redondo Beach	320
Pasadena/San Gabriel/Arcadia	540
Long Beach/Huntington Beach/Buena Park/Fullerton	1520
Santa Cruz	330
Encinitas/Carlsbad	400
Fremont	390
Sacramento/Land Park	220
Sacramento/Carmichael	370
Thousand Oaks	330

Network Effect on Location Scoring

- CEC will consult with ARB to evaluate network effect of proposed station awards
- Sequential, iterative recalculation of location values and scores may adjust award sequence and/or evaluation

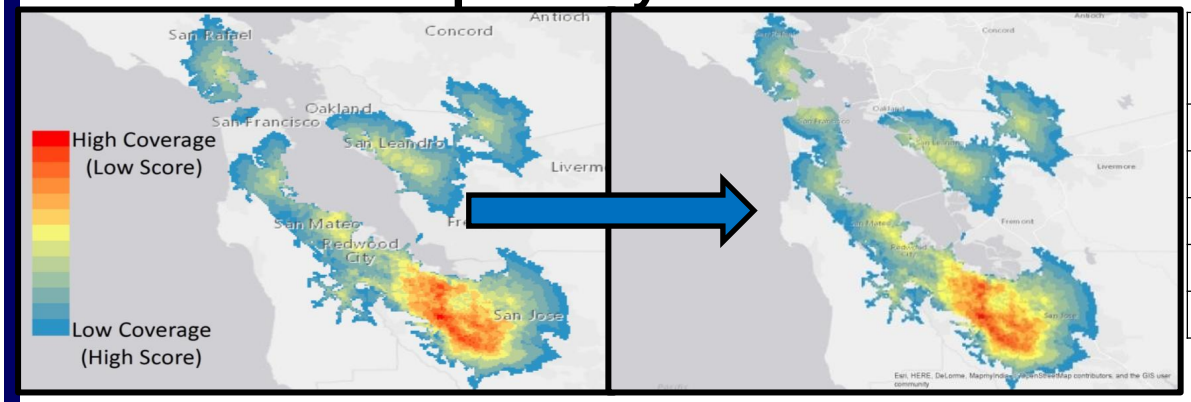
Illustrative Example Only

Proposed Location	Location Score	Other Scores	Total
✓A	25	75	100
B	24	68	92
C	20	71	91
D	18	70	88
E	17	65	82



Network Effect on Location Scoring

Illustrative Example Only



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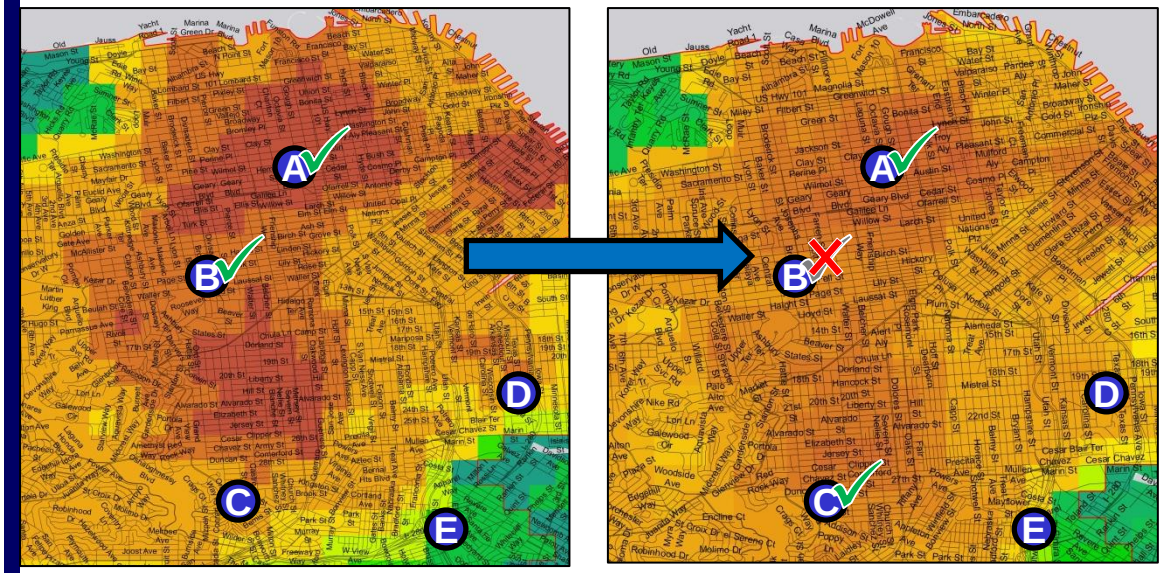
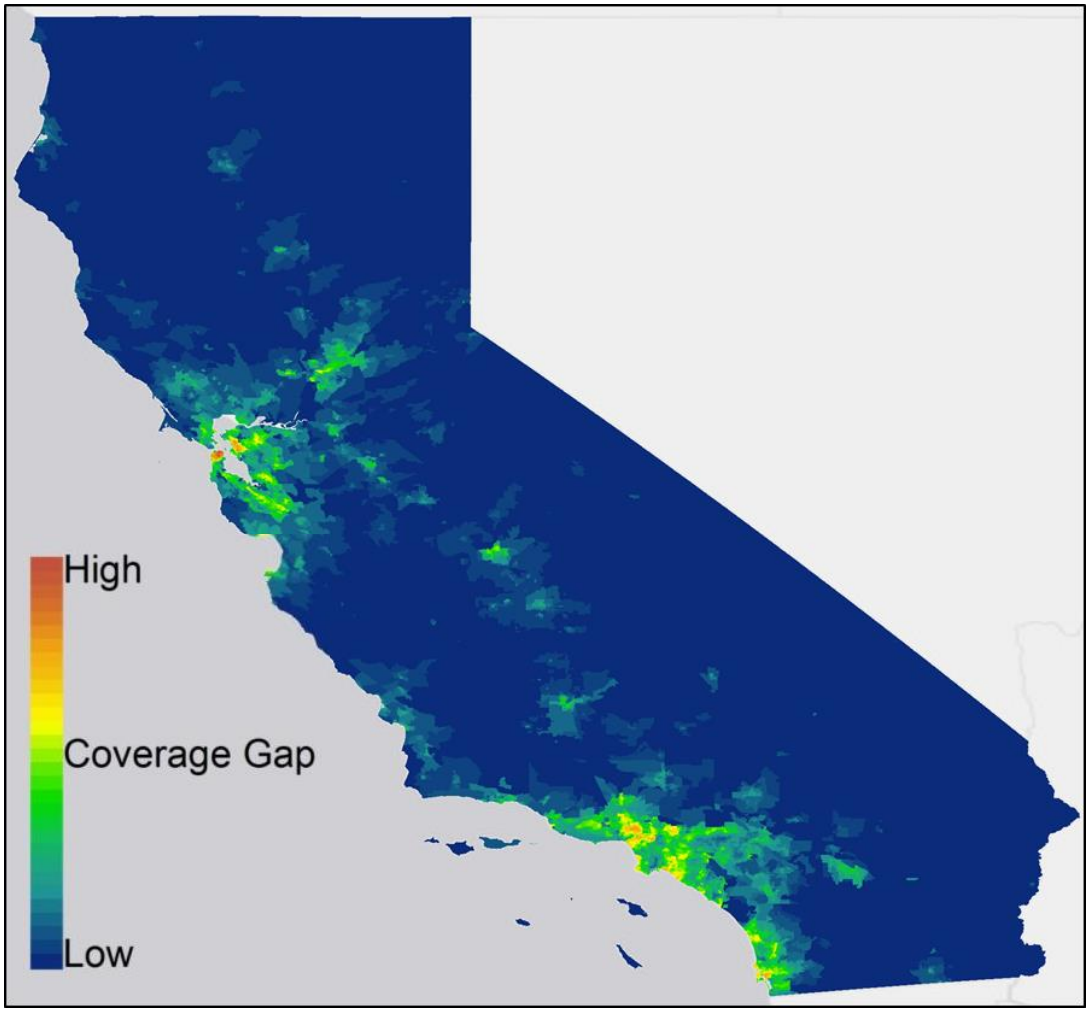


Proposed Location	Location Score	Other Scores	Total
✓ A	25	75	100
✓ C	17	71	88
B	18	68	86
D	16	70	86
E	16	65	81

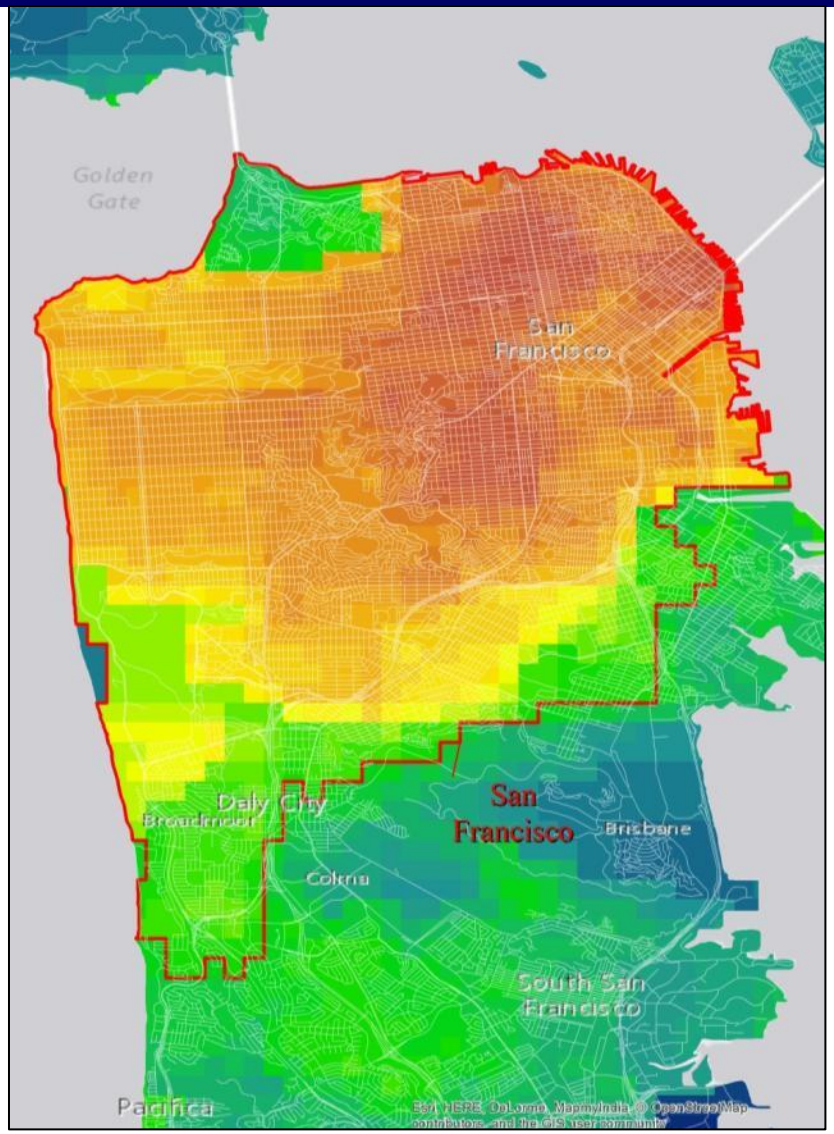
Repeat until all funds assigned…

Priority Areas



Priority Areas

- Applications DO NOT have to be within an identified Priority Area
- Location values and scores can be assessed anywhere in the state
- Priority areas are provided as general guidance to help applicants identify areas where a high location value and score are most likely to be achieved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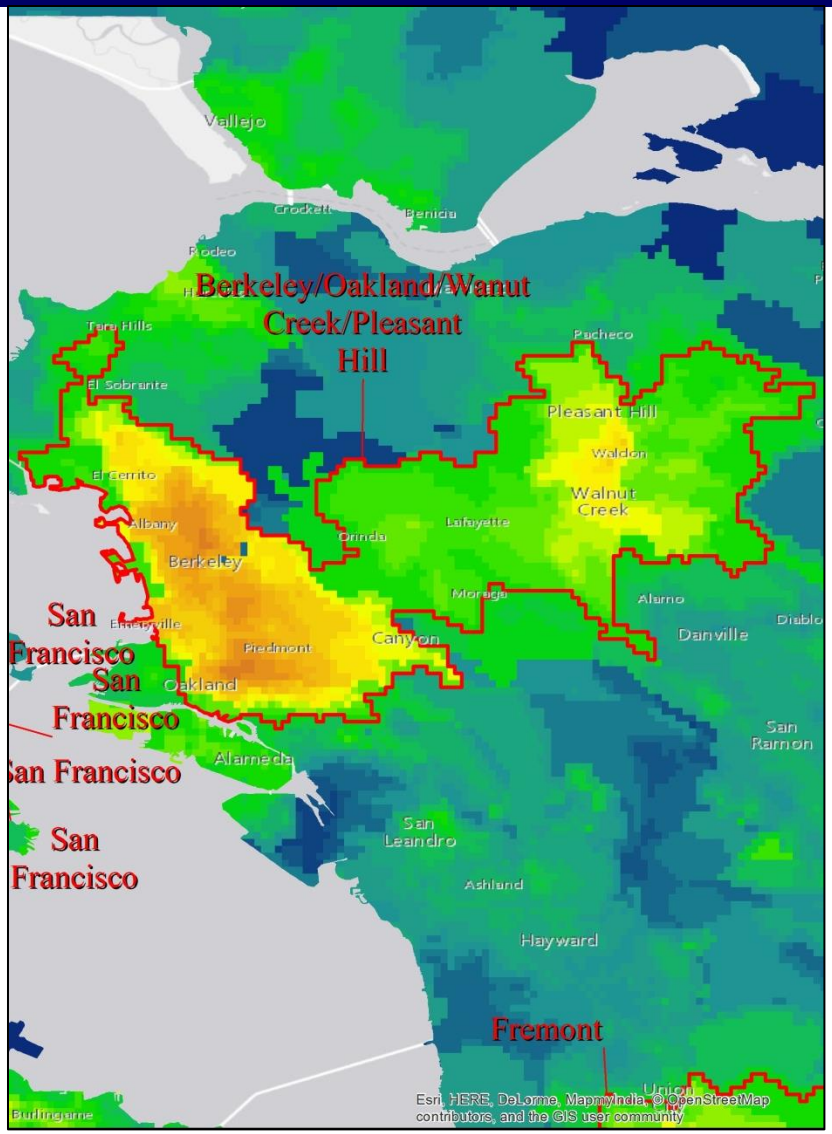
Daly City
Broadmoor
San Francisco
Brisbane
Colma
South San Francisco
Pacifica


Berkeley/Oakland/Walnut Creek/Pleasant Hill
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Crockett
Benicia
Rodeo
Tara Hills
El Sobrante
Pacheco
Pleasant Hill
Waldon
El Cerrito
Walnut Creek
Albany
Lafayette
Orinda
Berkeley
Moraga
Alamo
Danville
Emeryville
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Canyon
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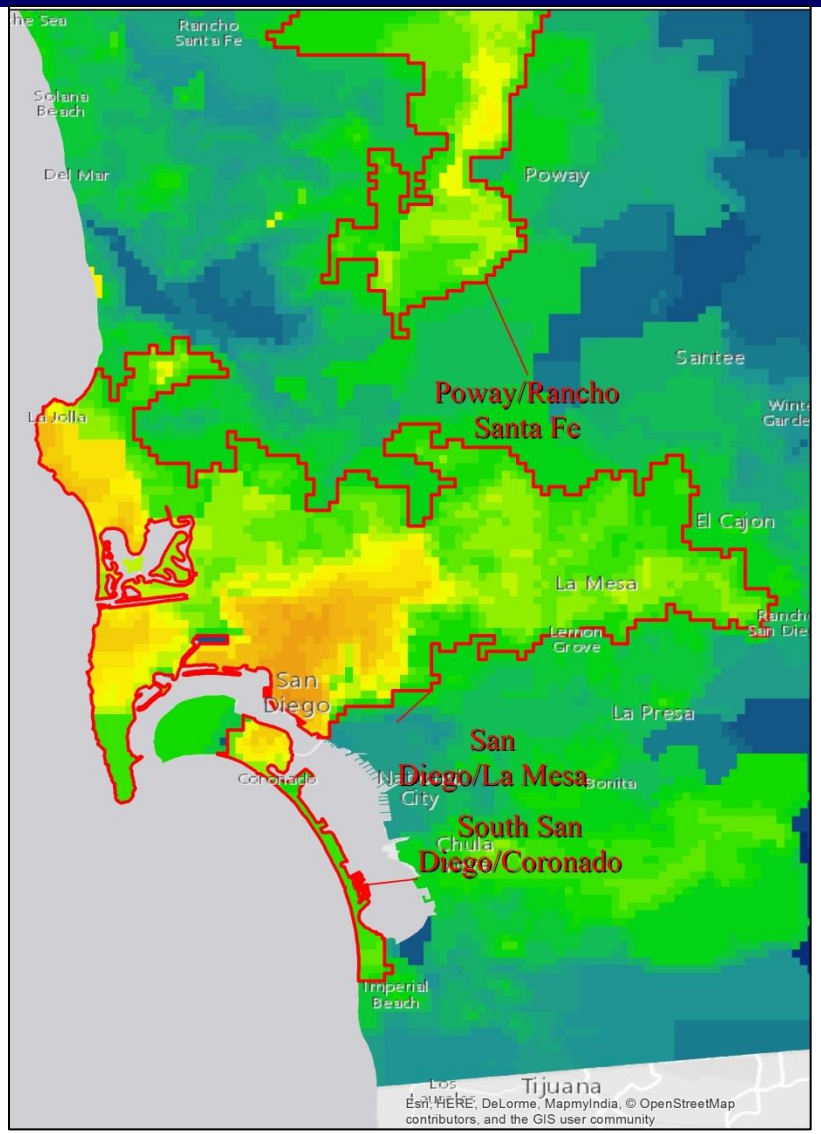

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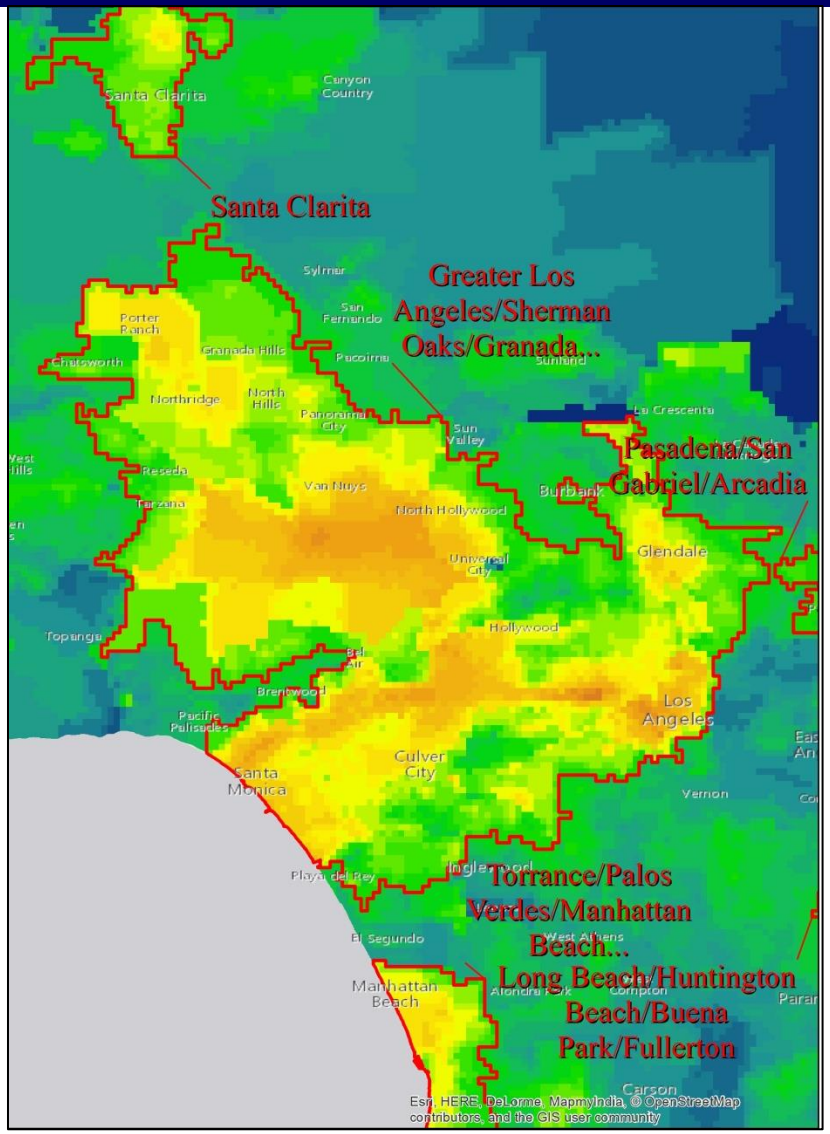

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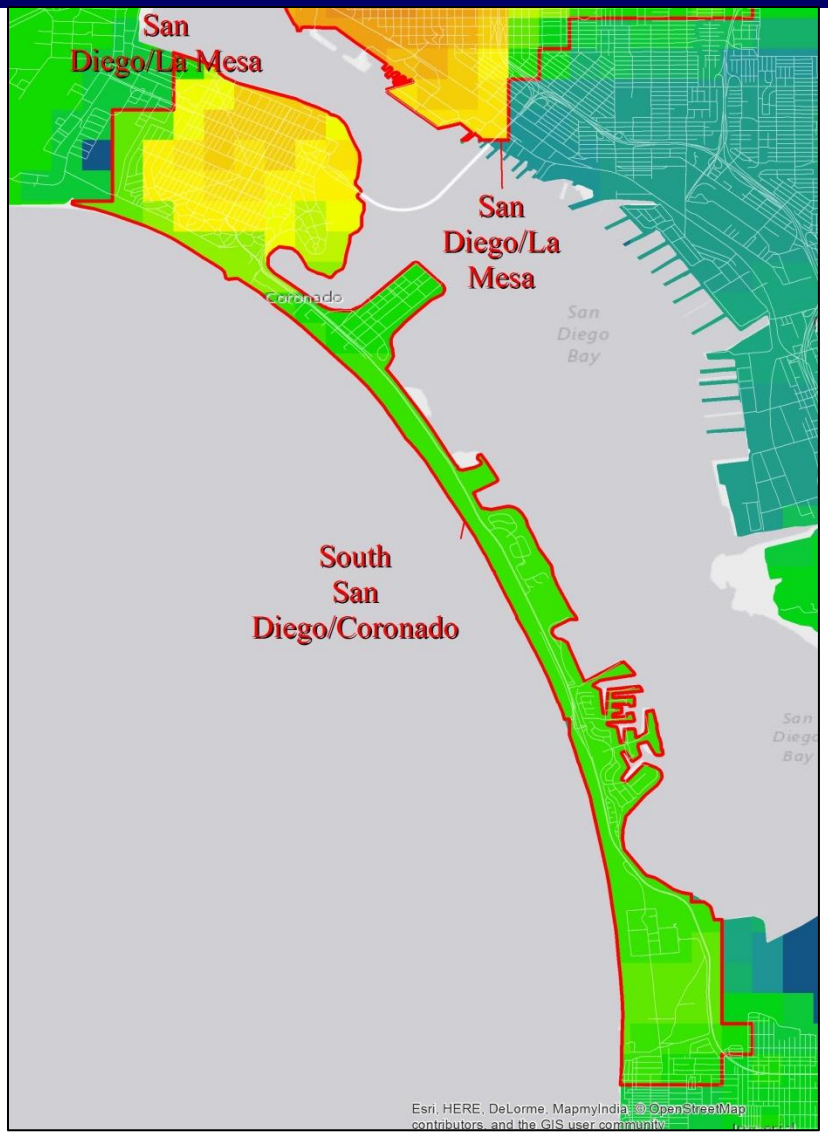

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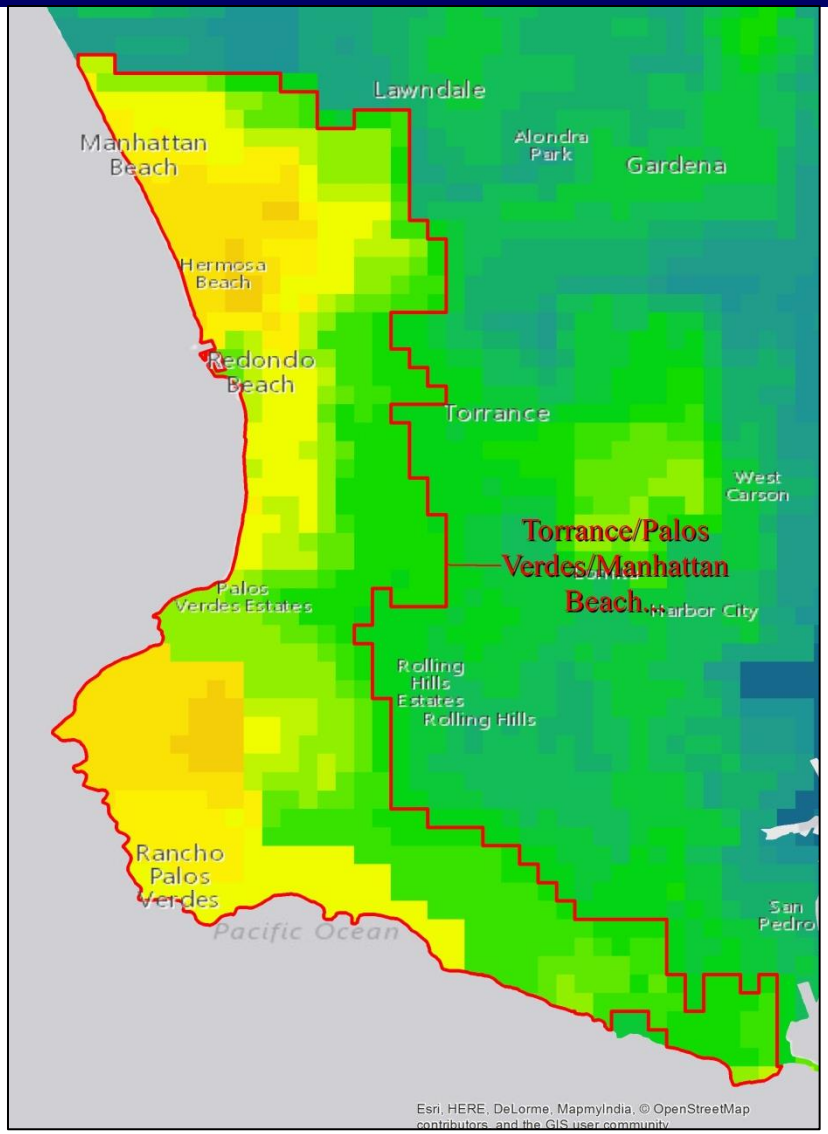

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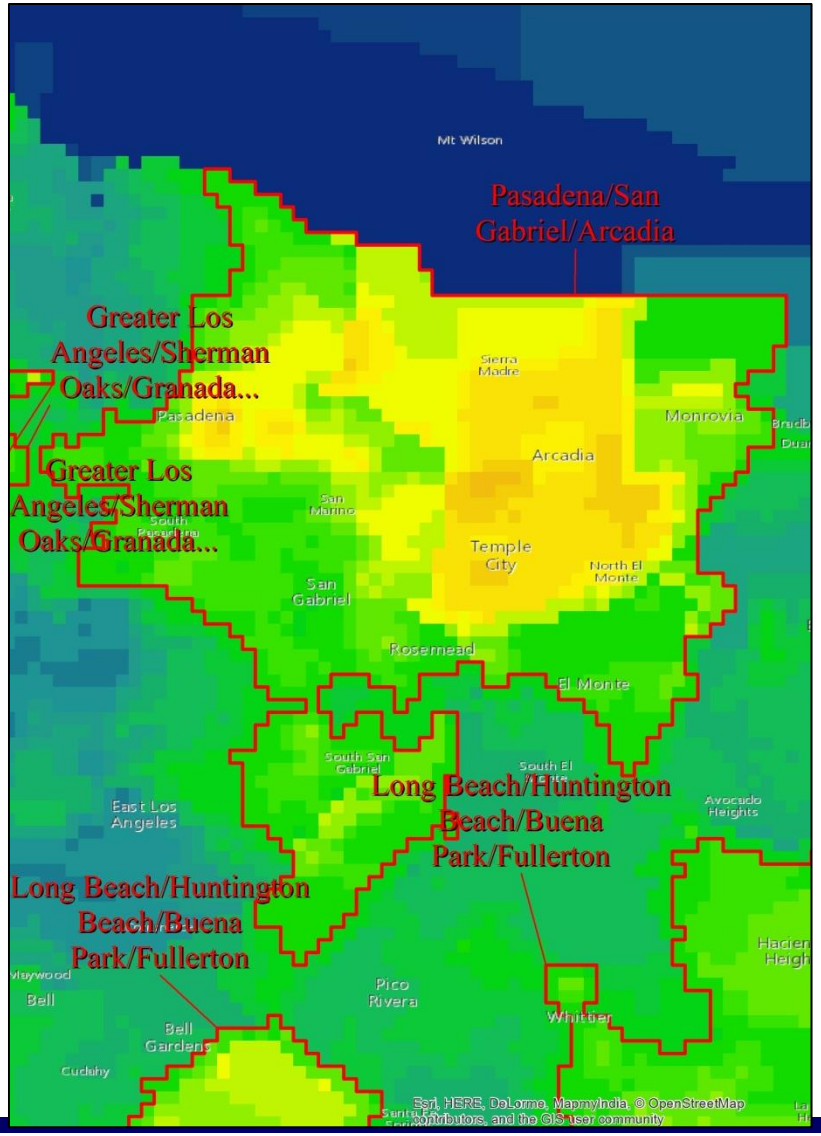

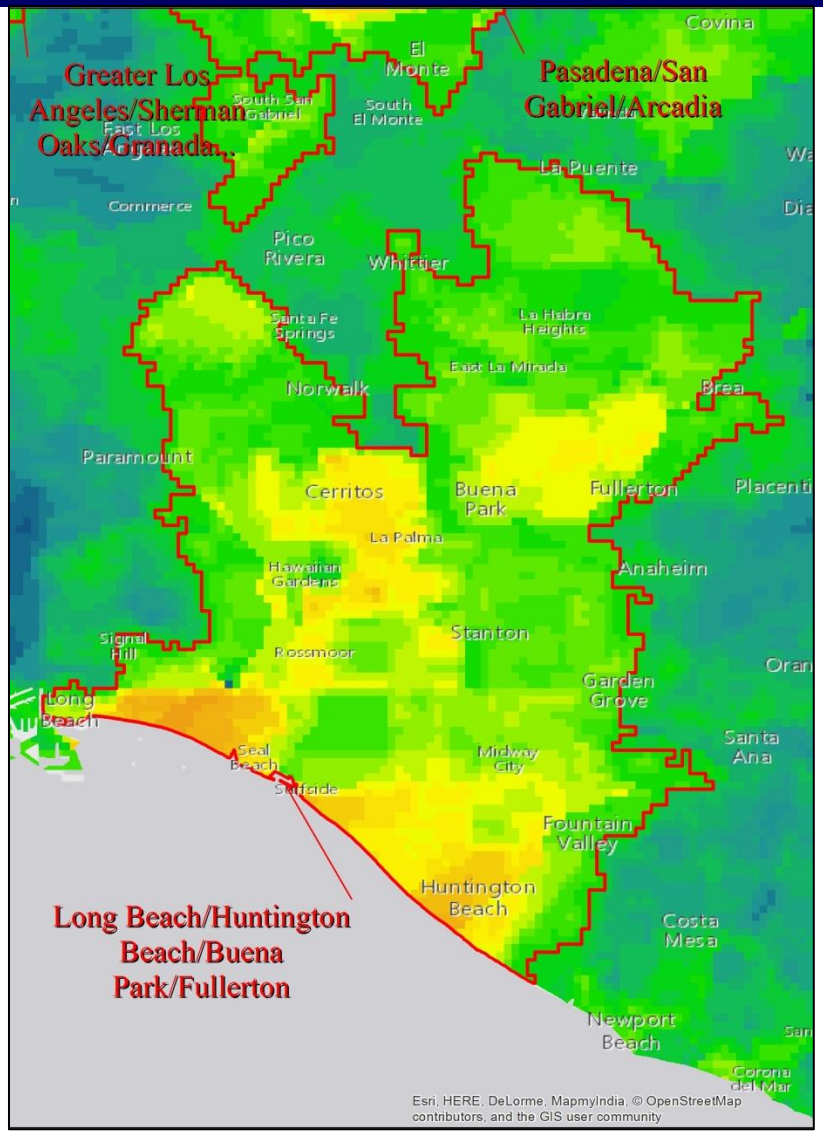
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Long Beach/Huntington Beach/Buena Park/Fullerton
Covina
El Monte
South El Monte
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La Puente
Pico Rivera
Whittier
Santa Fe Springs
La Habra Heights
East La Mirada
Norwalk
Brea
Paramount
Cerritos
Buena Park
Fullerton
La Palma
Hawaiian Gardens
Anaheim
Signal Hill
Rossmoor
Stanton
Garden Grove
Long Beach
Seal Beach
Sunset
Midway City
Santa Ana
Fountain Valley
Huntington Beach
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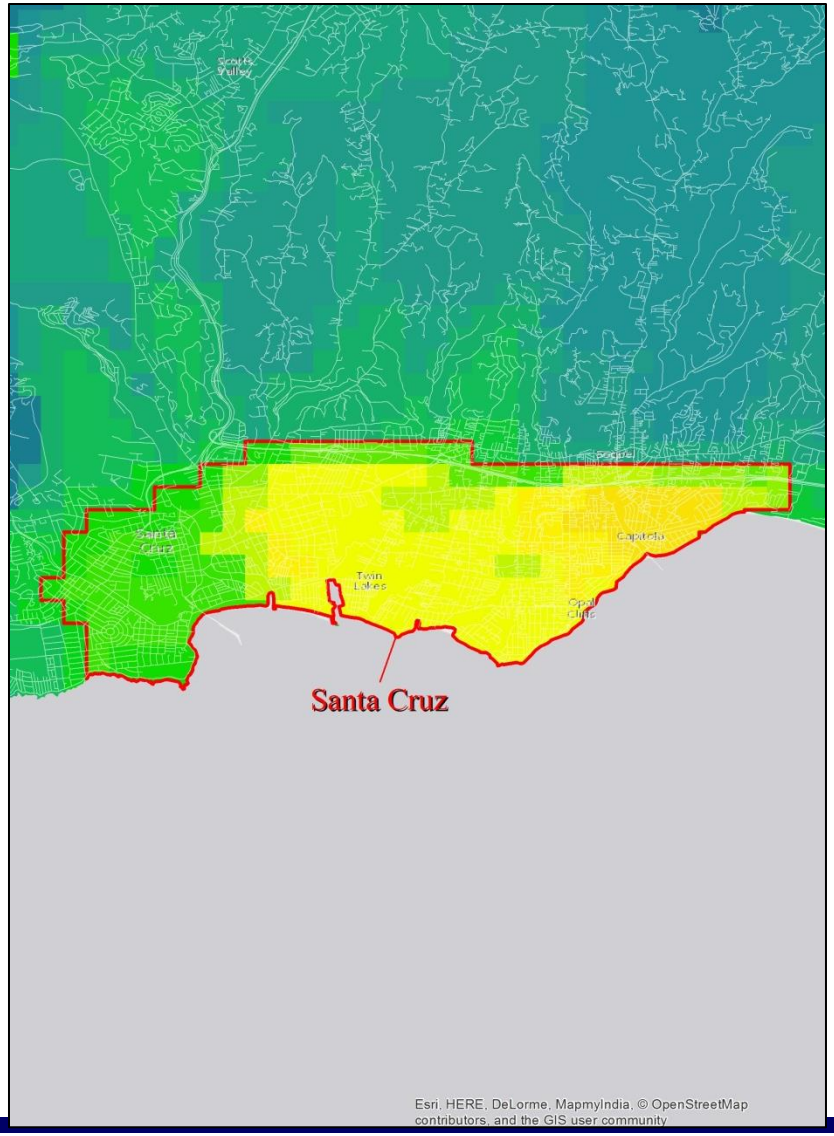
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Capitola
Opal Cliffs
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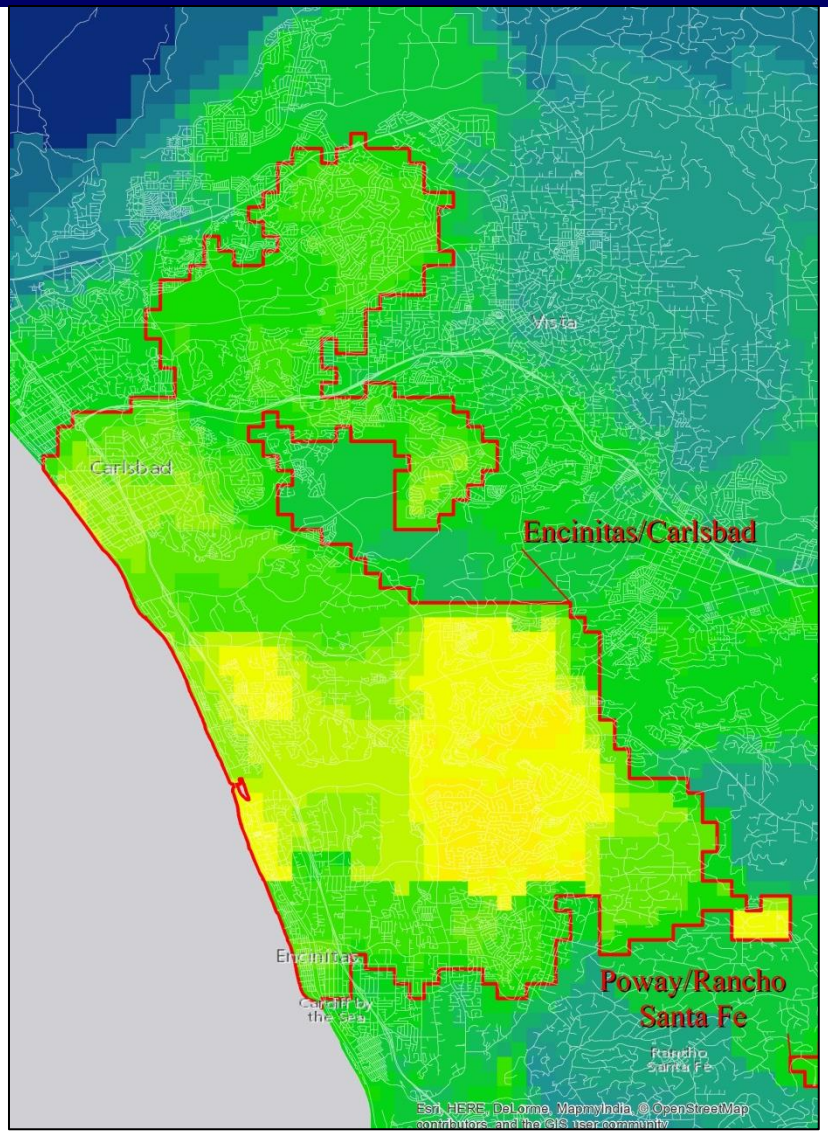

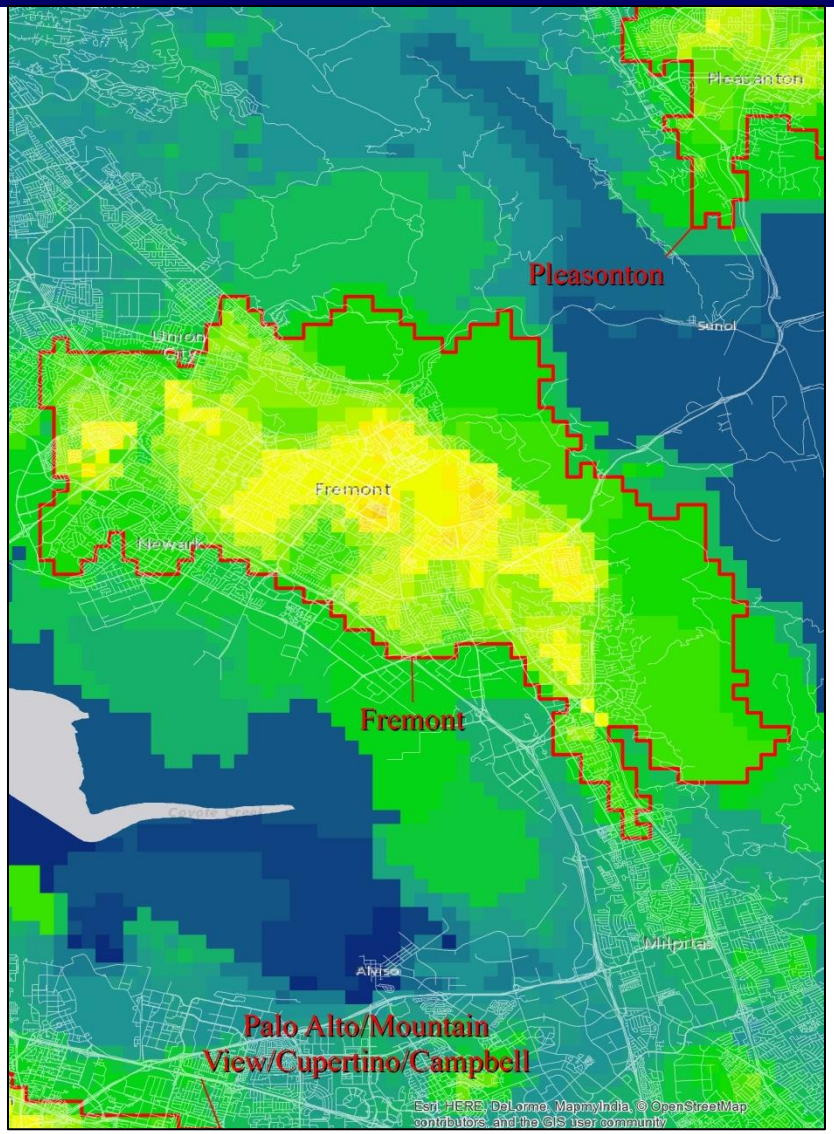
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Pleasonton
Sunol
Union City
Fremont
Newark
Fremont
Alviso
Milpitas
Palo Alto/Mountain View/Cupertino/Campbell
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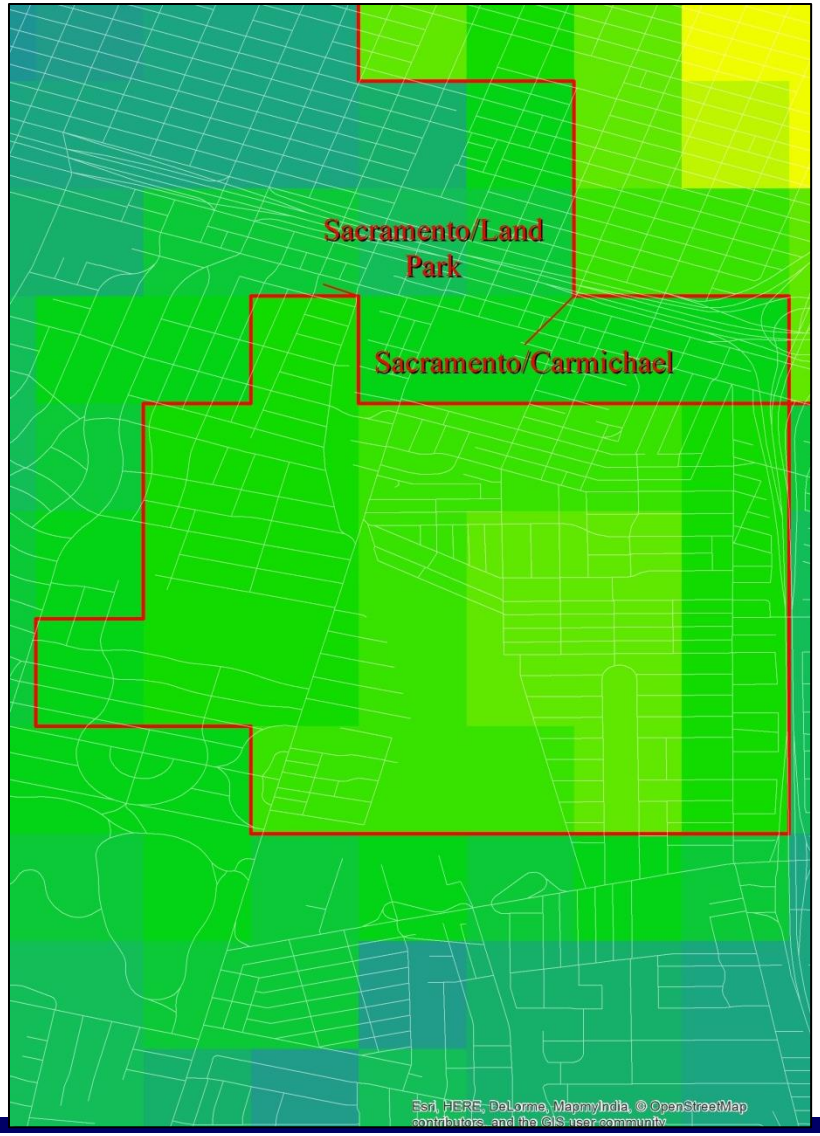
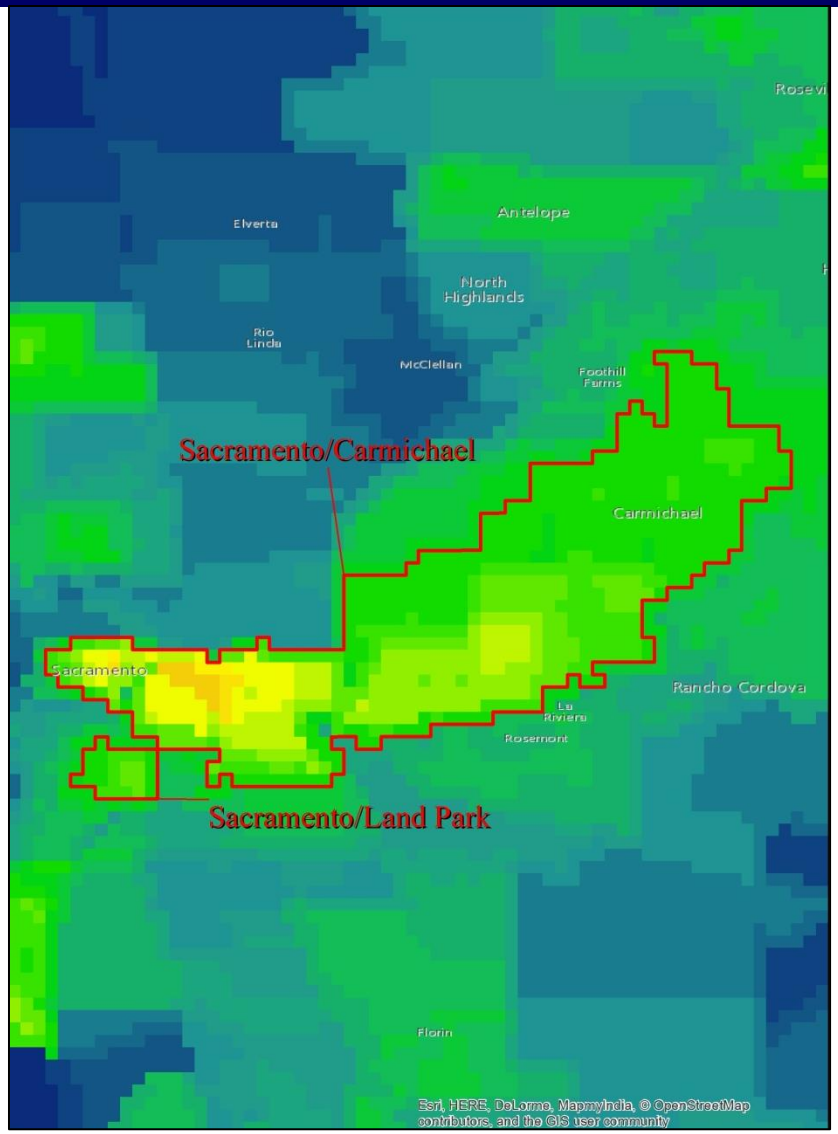
California Energy Commission



California Energy Commission



Important Message

- All material discussed today is DRAFT and/or ILLUSTRATIVE only
- DO NOT prepare application material based on maps, data, and comments presented today
- All material is subject to change before a PON is written, subject to comments from this workshop and developments in the currently funded stations

DISCUSSION

Break

Competitions, Funding, Applications

PHIL CAZEL AND SARAH WILLIAMS

Available Funding

- Up to $17.3 million
  - Capital expense (Cap-X),
  - Operation and Maintenance (O&M) for stations awarded under this solicitation.

Maximum Award

- Up to 75% of station costs,
- Or $1.875 million, whichever is less,
- Up to $300,000 for O&M.

Station Priority and Funding Levels

- Establish Core Market Competition
- Expand Core Market Competition
- Initiate Future Market and Develop Connectors Competition

Establish Core Market Competition

- Highest potential of early market adoption for FCEVs
- Market has no existing hydrogen refueling station coverage
- Maximum award: Up to 75% of station costs, or $1.875 million, plus O&M

Expand Core Market Competition

- Highest potential of early FCEV market adoption
- Market requires augmentation of existing coverage or faces challenge with future capacity
- Includes new stations and upgrades for stations funded prior to 2010
- New station maximum award: Up to 75% of station costs, or $1.875 million
- Upgrade maximum award: Up to 75% of station costs, or $1.5 million

Initiate Future Market and Develop Connectors Competition

- High potential of early market adoption, or
- Provides connector stations between markets.
- Maximum Award: Up to 75% of station costs, or $1.875 million, plus O&M funding

Priority Areas	Max. Stations Funded	Purpose
San Francisco	2	Establish Core Market
Berkeley/Oakland/Walnut Creek/Pleasant Hill	2	Establish Core Market
San Diego/La Mesa	1	Expand Core Market Coverage
South San Diego/Coronado	1	Expand Core Market Coverage
Pasadena/San Gabriel/Arcadia	1	Expand Core Market Coverage
Long Beach/Huntington Beach/Buena Park/Fullerton	1	Expand Core Market Coverage
Sacramento/Land Park	1	Expand Core Market Coverage
Sacramento/Carmichael	1	Expand Core Market Coverage
Greater Los Angeles/Sherman Oaks/Granada Hills/Glendale	1	Expand Core Market Capacity
Torrance/Palos Verdes/Manhattan Beach/Redondo Beach	1	Expand Core Market Capacity
Santa Cruz	1	Initiate Future Market
Fremont	1	Initiate Future Market
Thousand Oaks	1	Initiate Future Market
Encinitas/Carlsbad	1	Initiate Future Market
Lebec	1	Develop Connector
Los Banos	1	Develop Connector
Camp Pendleton	1	Develop Connector

Operational Date and Cap-X

Station Type	Maximum Funding (for stations operational in September 2018 or after)	Monthly Incentive Funding (per month for six months starting in March 2018)	Maximum Funding (for stations operational in March 2018 or before)
New Station	$1,500,000 or 60% of total station costs, whichever is less.	$62,500 per month	$1,875,000 or 75% of total station costs, whichever is less.
Station Upgrade	$1,235,292 or 60% of total station upgrade costs, whichever is less.	$44,118 per month	$1,500,000 or 75% of total station upgrade costs, whichever is less.

Operational Date, Cap-X, and Match

- The Energy Commission expects total project cost to remain constant throughout the project, unless cost savings are justified.
  - If the incentive date is not met, the Cap-X award decreases by $62,500 per month for number of months the project is not operational (up to six).
  - If the incentive date is not met, the match obligation increases to make up the difference between the total project cost and the Cap-X award.

Operational Date and O&M

	Station Operational on or before March 1, 2018	Station Operational between March 1, 2018 and September 1, 2018	Station Operational between September 2, 2018 and March 1, 2019
Maximum Percentage of O&M Support	100% of eligible O&M costs	80% of eligible O&M costs	60% of eligible O&M costs
Maximum Term for O&M Funding	March 1, 2022	March 1, 2022	March 1, 2022
Maximum O&M Funding Award per Station	$300,000	$240,000	$180,000

O&M Funding

- **Eligibility**
  - Stations funded by this solicitation that have not previously received O&M funding
- **Application process**
  - Submit an O&M Support Grant Application form
- **Funding for multiple stations**
  - O&M may be pooled to cover multiple stations from this solicitation

Eligible O&M Costs

- Allowable per solicitation,
- Documentable and measurable,
- Non-duplicative of other reimbursed or match costs,
- Allocable to the station(s) funded in this solicitation,
- Reasonably necessary maintenance of equipment
- Insurance, and
- Rent or lease payments for the station.

Ineligible O&M Costs

- Costs to procure and/or produce hydrogen gas for retail sale,
- Property taxes, interest, penalties,
- Maintenance that adds permanent value to the equipment,
- Indirect costs, and
- Non-cash expenses.

O&M Documentation and Data Collection

- **Documentation of costs**
  - Invoices must be supported

- **Data Collection**
  - Required during the time O&M support is received using the National Renewable Energy Laboratory (NREL) Data Collection Tool
  - Minimum of 36 months (3 years)

Eligible Projects

- New hydrogen refueling stations or upgrades
- Located in California
- Publicly accessible
  - Must sell fuel without the use of access, liability, or user contracts for corporate customers, partners or consumers
- Meet the “Minimum Technical Requirements”

Agreement Execution

- Fully executed by Recipient within 90 days of project approval at an Energy Commission business meeting.
- If this deadline is missed, the Energy Commission reserves the right to cancel the proposed award and recommend awarding funds to the next eligible project.

Multiple Station Applications Allowed

- Within a single application
- Each station within the application will be evaluated, scored, and ranked individually.

Single Applicant Cap

- A single Applicant is eligible for no more than 60% of the total funds awarded under this solicitation.

Match Share Funding

- Must meet minimum 25% match share requirement.
- Proposals with a greater percentage of the total project costs in match share funding will be scored higher in accordance with the Scoring Criteria.
- Match share funding requirement will change based on actual station operational date.

Break

Minimum Technical Requirements

GERHARD ACHTELIK

Minimum Technical Requirements

- Must meet each of the minimum technical requirements
- Projects exceeding the minimum technical requirements may score higher

Minimum Technical Requirements

- **Hydrogen Quality/Purity**
  - Meet SAE International J2719,
  - Delivery vehicle shall display the hydrogen purity,
  - Accommodate sampling by the Division of Measurement Standards (DMS) or other agencies, and
  - Continuously monitor the gas stream (in-line analyzer).

Minimum Technical Requirements

- **Fueling Protocols**
  - Dispenser(s) shall meet SAE International J2601: 2014, or the most recent version published.

Minimum Technical Requirements

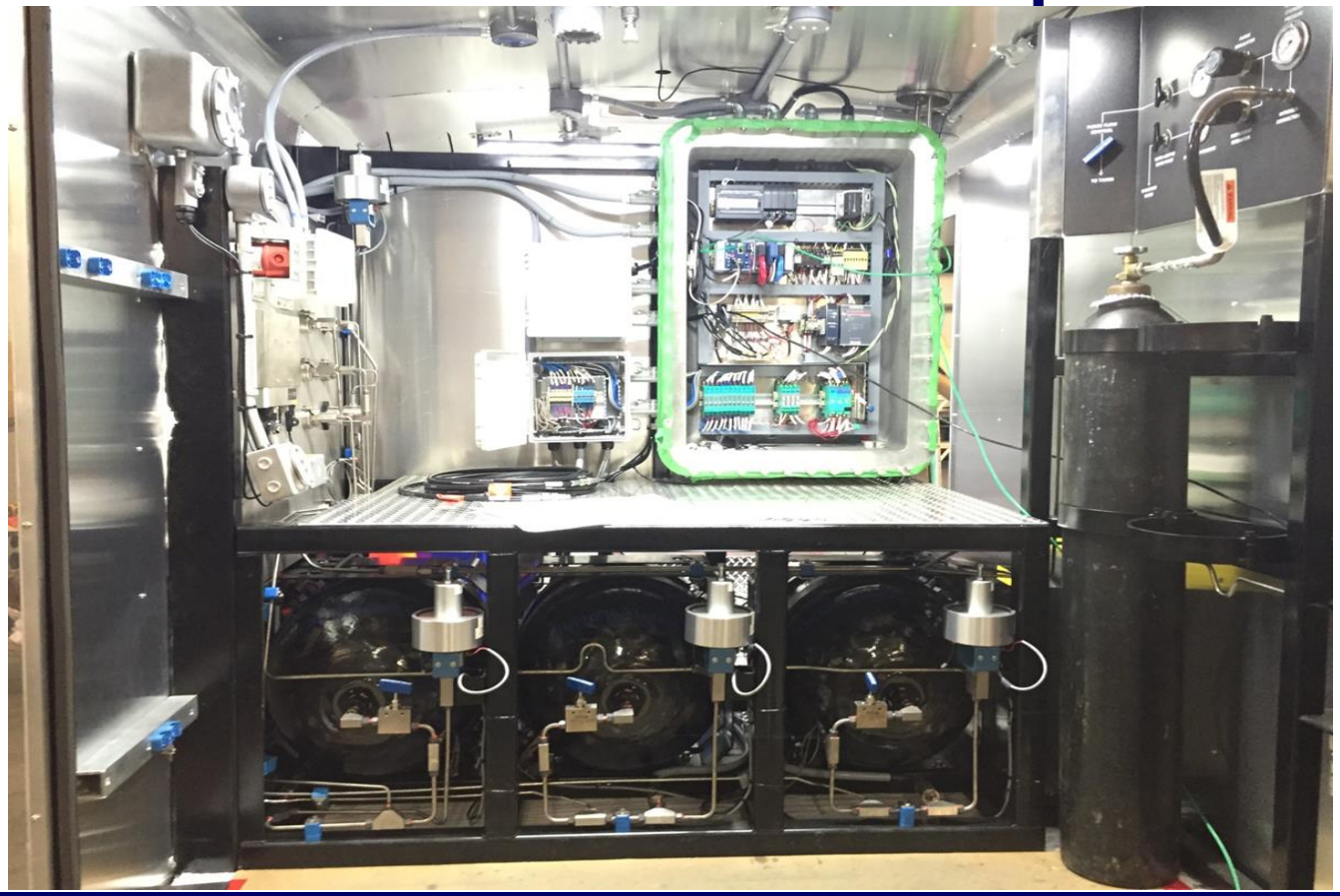
- **Test Method and Equipment Specification to Confirm Performance**
  - Use CSA HGV 4.3:2012 to confirm performance
  - Use Hydrogen Station Equipment Performance Device (HyStEP) or equivalent, or OEM validation to confirm fueling protocol
  - Provide data output to HyStEP operators
    - Temperature and pressure

HyStEP Implementation

- Current SAE J-2601 (and related standards) validation process:
  - Tests typically require re-programming and equipment adjustments
  - Delays often occur (days or months)
- HyStEP:
  - Acts as a “surrogate” OEM vehicle using CSA HGV 4.3
  - May be re-deployed multiple times
  - Decreased commissioning times
  - OEMs may continue to conduct some verification fills after HyStEP validation
  - Path towards certification, third party labs, i.e., counties, in the future

HyStEP Device

View with Back Doors Open



Dispenser Test Summary Report

HyStEP Operator name/organization:

Station Operator/technician name/organization:

Station description/technology provider:

Station Street Address:

Dispenser manufacturer, model, serial number or other identifier:

Dispenser protocol software version:

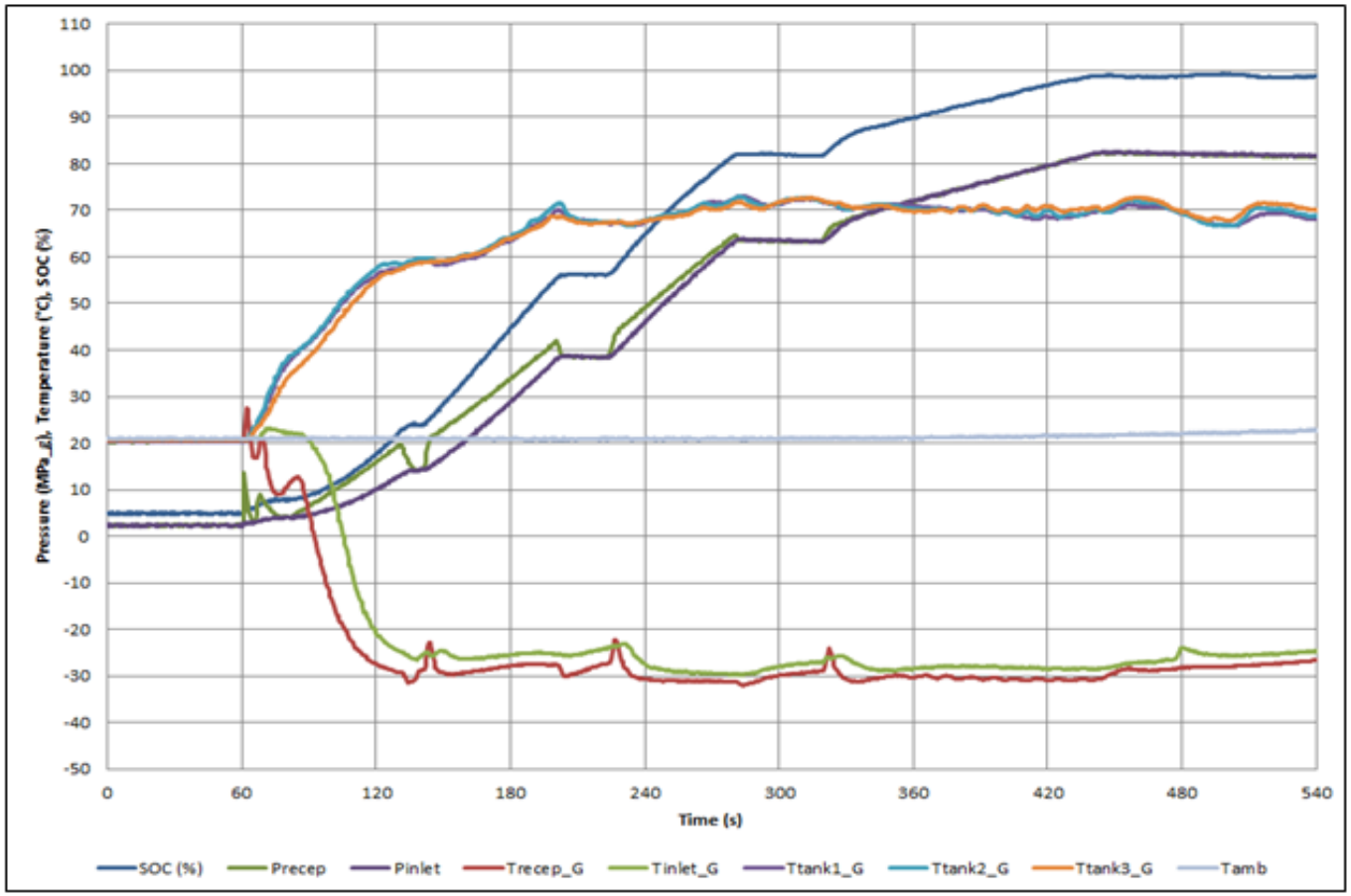
Pressure Class	Communication	Fuel Delivery Temperature Category	CHSS Capacity Category
☑ H70	☑ Communication ☑ Non-Communication	☑ T40 ☐ T30 ☐ T20	☑ Small ☑ Medium ☑ Large
☑ H35	☐ Communication ☑ Non-Communication	☑ T40 ☐ T30 ☐ T20	☑ Small ☑ Medium

Test Summary List					
Test	Test ID	Pass/Fail	Notes	Graph	Report
CHSS Storage Limits	7.1.1-A			☐	☐
CHSS Storage Limits	7.1.1-B			☐	☐
Ambient Temperature Limits	7.1.2-A			☐	☐

List of Potential Tests (ignore columns on right)

Test	Clause	# of Tests	Pass/Fail	Notes
General Fault Detection Tests				
CHSS Storage Limits	7.1.1			
Ambient Temperature Limits	7.1.2			
Minimum Fuel Delivery Temperature	7.1.3			
CHSS Gas Temperature	7.1.4			
Minimum Initial CHSS Pressure	7.1.5			
Maximum CHSS Pressure	7.1.6			
Maximum State of Charge	7.1.5.1			
Table Based Communications Testing				
ABORT Signal Test	8.7.1			
HALT Signal Test	8.7.2			
Data Loss Test and then ABORT Test	8.7.3			
Data Loss Test and then RESUMED Test	8.7.4			
Faulty Data Test	8.7.5			
CRC Test	XXX			
Table Based Fueling Protocol Testing				
Fueling Test without Communications	8.5.1			
Fueling Test with Communications	8.5.2			
Additional Tests – Repeated Table	8.2.5			
Additional Tests – No Fueling (NF) Test	8.3.6			
Additional Tests—High Pressure (HP) Capacity Test	8.2.7			
Additional Tests—Pre-Cooling (PC) Capacity Test	8.2.8			
Fuel Delivery Temperature Fallback Test	8.5.3			
Top Off Fueling	8.5.4			
Cold Dispenser Test	8.5.5			

HyStEP Draft Report w/ Communications



Minimum Technical Requirements

- **Minimum Station Daily Fueling Capacity**
  - No less than 150kg per day (12 hour period),
  - Able to increase capacity to 250kg per day,
  - Multiple stations funded under this solicitation may be considered together as a group (within a specified geographic area) and the application shall include capacity information on a station-by-station basis to compensate if not all are funded,
  - Total shall meet the minimum average daily fueling capacity

Minimum Technical Requirements

- **Minimum Peak Fueling Capacity**
  - Seven 5kg Type A fills per hour for 70 MPa
  - Seven 5kg Type B fills per hour for 35 MPa
  - One hour period, back-to-back

Minimum Technical Requirements

- **Dual Dispenser Pressure**
  - 700 bar and 350 bar
  - H 70-T 40 and H 35-T 20

- **Hydrogen Dispensing**
  - Dispenser shall satisfy NIST Handbook 44: 2013, or
  - CDFA Regulations

Minimum Technical Requirements

- Accommodate mobile refueler or tube trailer.
- Renewable hydrogen 33% or higher.
- Public Point of Sale (POS) terminal.
- Plan to ensure that the station will appear on an online station status system.

Minimum Technical Requirements

- Retail
  - Open to the public (unrestricted access without the requirement of an access card or PIN code),
  - Without OEM/customer liability agreements and formal/registered station training of each individual customer

Station Design

PHIL CAZEL

Refueling, Point of Sale, and Connection with an Online Status System

- Station design accommodates mobile refueling or a tube trailer. (min tech require.)
- Public Point of Sale (POS) terminal. (min tech require.)
  - Credit card, debit card, and/or fleet card payment systems
  - “EMV” (Europay Mastercard VISA)
- Plan to ensure the station will appear on an online station status system (optional… should provide)
  - Example: California Fuel Cell Partnership Station Operational Status System (SOSS).

Day 1 Wrap-up and Discussion

- Review of workshop discussions,
- Additional comments.

DAY 2

AUGUST 14, 2015

Applications, screening, scoring, and evaluation

SARAH WILLIAMS, ANDREW HOM, AND ERIC VANWINKLE

Letters of Support/Commitment

- Site owner/operator
- Third party match share commitment
- Key project partners
- Third-party letters of support

Application Screening Criteria

- Applicant is eligible to apply under this solicitation.
- Proposed project is eligible in accordance with this solicitation.
- Project meets each of the Minimum Technical Requirements.

Evaluation Process

- Proposals will be scored in accordance with the Scoring Criteria.
- To be eligible for funding, projects must achieve the minimum passing score of 70%.
- Proposals will be ranked according to score.
- Once an Applicant exceeds the Single Applicant Cap, remaining stations from the Applicant will be disqualified and not eligible for funding. The Energy Commission reserves the right to modify or eliminate this cap.

Evaluation Process

- Ties, if any, will be broken in the following order:
  - Proposal with highest “Market Viability” score.
  - Proposal with highest “Hydrogen Refueling Station Performance” score.
  - Proposal with highest renewable hydrogen content.
  - If still tied, an objective tie-breaker will be utilized.
- Proposals will be recommended for funding in ranked order until funds in the solicitation have been exhausted.

Scoring Criteria	Points
Qualifications of Applicant/Project Team	30
Location and Capacity	50
Market Viability	50
Safety Planning	50
Project Readiness	30
Project Implementation	40
Project Budget	40
Economic and Social Benefits	20
Hydrogen Refueling Station Performance	50
Innovation	20
Sustainability	30
TOTAL POSSIBLE POINTS:	**410**

Qualifications of Applicant/Project Team (30 points)

- Is qualified to implement the proposed project.
- Demonstrates the ability to work with the hydrogen refueling technology or other gaseous fuels by disclosure of the details of the applicant's role working on refueling stations in the past including the dates, locations, the type of fuels dispensed, and the amount of fuels dispensed.

Qualifications of Applicant/Project Team

- Demonstrates the
  - ability to meet deadlines and milestones of large scale fueling projects,
  - ability in logistics management relevant to hydrogen refueling,
  - experience completing recent work projects related to the scope of work of the application,
  - knowledge and understanding of California's hydrogen refueling infrastructure and how the proposed hydrogen refueling station(s) works within, and
  - experience and knowledge of hydrogen refueling station permitting process(es) applicable to a particular site.

Qualifications of Applicant/Project Team

- Demonstrates the
  - knowledge of the tests and techniques related to comply with hydrogen purity testing and the applicable hydrogen production/delivery.
  - experience applying state of the art techniques in designing and building a hydrogen refueling station.
  - knowledge of station equipment reuse and recycling techniques.

Location and Capacity (50 points)

- Proposals will be scored based on the degree to which the proposed station provides coverage and capacity determined by CHIT.
  - Coverage Analysis: ability of the proposed station to cover an identified gap in service of an identified market according to the CHIT model.
  - Capacity Analysis: ability and appropriateness of the proposed station to fulfill the needed capacity of an identified market according to the CHIT model. Stations with daily fueling capacity closer to or exceeding a capacity gap will score higher.

Location and Capacity

- As stations are recommended for proposed awards, subsequent CHIT analyses will be conducted on the remaining applications to consider the impacts of the proposed station awards. This has the potential to affect the location and capacity score of applications.
  - Therefore, scores will be based on CHIT analyses and output that may differ from the information received from ARB during the application development process.

Market Viability (50 points)

- The capacity and cost, including the fuel pathway, are suitable for the proposed station location over time. Stations with capacities and costs more suitable to their proposed location will score higher.

- The station will have the ability to serve the consumer, reliably meet the fill needs for the projected demand of vehicles, and exhibit a plan for continuous improvement to customer service.

Market Viability

- The project plan is sufficient to meet the expected business opportunities and business climate for the proposed station, including the anticipated cost (and calculations) to the customer per kilogram of hydrogen for three to five years after the station is operational.

Market Viability

- The station will contract with local fleets to assure high, constant hydrogen utilization throughout the station's lifetime.
- The demand for hydrogen refueling at the location of each station is reasonable, realistic and documented.

Safety Planning (50 points)

- The proposal includes safety features in the design of the hydrogen refueling station, such as
  - air-operated valves configured with spring return actuators,
  - sensors,
  - cameras,
  - mitigation strategies that reduce the risk of incidents to the public,
  - integration of hydrogen safety devices with existing gas station safety systems, and
  - other onsite safety features and equipment.

Safety Planning

- The proposed project is in compliance with the most recently published edition of the National Fire Protection Association (NFPA) 2, Hydrogen Technologies Code, 2011 Edition.
- The proposal provides current, timely and easily accessible information about the station to First Responders in the event of an emergency, including a publicly available station maintenance plan.

Safety Planning

- The Applicant provides a realistic, timely and comprehensive plan to assure safety training for the station's initial operation and safety retraining over time for all station operators.

Project Readiness (30 points)

- The project is consistent with existing zoning requirements of the proposed location.
- The Applicant has secured or initiated actions to secure required permits for the proposed project.
- The proposed permitting schedule ensures successful project completion within the timeframes specified in this solicitation.

Project Readiness

- The proposal includes detail about the project components that are certified by third-party standards compliance organizations and test organizations, i.e., the Underwriters Laboratories (UL).
- The project progressed in obtaining compliance under the California Environmental Quality Act (CEQA) per the requirements of the solicitation.

Project Readiness

- The engineering site plan demonstrates feasible hydrogen station design within the site's footprint given acceptable separation distances pursuant to local, State, and Federal codes and standards, e.g., NFPA 2.
- The proposed project schedule is reasonable and installation can be complete on or before March 1, 2018.

Project Readiness

- Outreach to the community, including Fire Marshals, has either taken place or is planned to educate the public about the potential hydrogen fueling facility.
- The proposed project coordinates with Regional Readiness Plans, either existing or under development.

Project Readiness

- Correspondence demonstrates that the site's representative is committed to operating the hydrogen refueling station.
- Proposal demonstrates and documents site control (including but not limited to lease or access rights) needed to design the station; to install equipment and storage tanks; and for the entrance, exit and parking of vehicles to the proposed station property.

Project Readiness

- The proposed project facilitates traffic approaching, entering, and leaving the station and traffic circulating within the station and to accommodate station setback requirements.
- The proposal includes reports of pre-application discussions with the permitting agencies and Fire Marshals.

Project Implementation (40 points)

- The proposal demonstrates that the proposed project, including permitting, will be completed in an effective and efficient manner.
- The proposed station provides a plan for dispensing renewable hydrogen, in excess of the minimum 33% renewable requirement. Stations that dispense more than 33% renewable hydrogen will score higher.

Project Implementation

- The schedule, sequence of tasks, and appropriate objectives of the proposed project are clear, complete, reasonable, and logical.
- The scope of work is clear, complete, reasonable and logical.
- A thorough and viable maintenance plan that facilitates the continued, ongoing station operation beyond the required three year operational time requirement.

Project Implementation

- Procedures exist and are implemented to maximize station “up-time” to meet fill requests, including station monitoring.
- The applicant applies programmable, flexible dispensing, perhaps during non-peak hours, to non-light-duty vehicles (i.e., medium- and heavy-duty trucks such as delivery vehicles).
- The plan to connect with an online status system is sufficient to provide station status information to potential fuel cell electric vehicle owners.

Project Budget (40 points)

- The proposed project is cost-effective.
- The proposed project results in a higher benefit-cost score in terms of GHG reductions per Energy Commission dollar provided to the project.
- The proposed station's project budget and costs are reasonable and suitable.

Project Budget

- The proposed match share is committed.
- The proposal exceeds the minimum match share requirements.
- State funds are necessary for the installation of the proposed project.

Economic and Social Benefits (20 points)

- The proposed project expands opportunities for California-based businesses.
- The proposed project creates jobs.
- The proposed project results in positive economic and job benefits in disadvantaged communities within California.
- The proposed project results in tax revenues from the station.

Hydrogen Refueling Station Performance (50 points)

- The daily fueling capacity of the proposed station(s), individually, or as a collection of stations, funded under this solicitation, exceeds the minimum average daily fueling capacity specified in this solicitation, measured over a twelve hour period.

Hydrogen Refueling Station Performance

- The peak fueling capacity of each proposed station exceeds the minimum peak fueling capacity specified in this solicitation.
- The proposed station has a viable plan to increase capacity of the station within three years of the station operational date with no additional funding from the State.

Hydrogen Refueling Station Performance

- The proposed station has the ability to serve the expected daily traffic count (DTC) or the amount of vehicles passing the station per day, per week, or for the time period during which the planned station will remain open and has higher average number of fills over both a one hour and 12-hour period.

Hydrogen Refueling Station Performance

- The traffic circulation in the proposed station supports throughput, efficiency and performance, including unobstructed ingress/egress to the fueling facility.
- The proposed station provides adequate lighting to assist station users.

Hydrogen Refueling Station Performance

- The proposed project includes directional signage to the station (pathfinder signs) and also signage from the nearest thoroughfare.
- The proposed project maximizes the hours of operation and addresses the quiet hours of the locality.

Hydrogen Refueling Station Performance

- The proposed project provides for a customer fueling experience comparable to existing gas stations, including the availability of a fueling station attendant.
- Multiple vehicles can be filled with hydrogen simultaneously.

Innovation (20 points)

- Proposals will be evaluated on the degree to which the proposed project includes innovation(s) that improve consumer fueling experience, increase station cost-effectiveness, and/or increase the effectiveness of the hydrogen refueling network.

Examples of Innovation

- Unique or advanced features of the project or hydrogen refueling station technology.
- The station provides an additional hose, without a chiller, to provide lower-priced hydrogen for consumers who are comfortable with longer fill times.
- Stations with equipment that can be relocated and reused as demand increases.
- Unique use of standard Point of Sale (POS).
- Unique use of space.
- Efficiencies in supply chain management.

Sustainability (30 points)

- The proposed project achieves reductions of greenhouse gas (GHG) emissions to help meet the California Air Resources Board (ARB) identification of the statewide greenhouse gas emissions limit 2020 http://www.arb.ca.gov/cc/scopingplan/document/updatedscopingplan2013.htm.

Sustainability

- The proposed project maximizes the use of renewable resources or fuels, as defined within the Renewables Portfolio Standard Eligibility, Seventh Edition guidebook.
- The proposed project utilizes recycled materials and repurposed equipment and materials.

Sustainability

- The proposed project maximizes the efficient use of water through water recycling/reclamation.
- The proposed project maximizes energy efficiency for system power.

Sustainability

- The proposed project preserves and enhances the use of natural resources in the State and promotes superior environmental performance of alternative and renewable fuels.
- The proposed project uses alternative fuels for trucks that transport the renewable hydrogen.
- The proposed project uses curtailed electricity from California's electricity grid.

Renewable Hydrogen Requirements

- Applicants must provide a plan for dispensing at least 33% renewable hydrogen through direct physical pathways for all station proposals.
  - Biomethane or biogas such as: biomass, digester gas, landfill gas, sewer gas, or municipal solid waste gas.
  - Other feedstocks may be eligible if the Application demonstrates that the proposed feedstock is sustainably produced, reduces greenhouse gas emissions compared to the petroleum baseline, and achieves the ARFVTP sustainability goals contained in 20 CCR 3101.5.

Eligible Renewable Electricity Sources

- Fuel cells using renewable fuels
- Geothermal
- Small hydroelectric (30 megawatts or less)
- Ocean wave
- Ocean thermal
- Tidal current
- Photovoltaic (PV)
- Solar Thermal
- Wind
- Biomass digester gas
- Municipal solid waste conversion (non-combustion thermal process)
- Landfill gas
- Renewable Energy Certificates (RECs)

Break

CEQA and Permitting

SAMANTHA ARENS

Station location and milestone enforcement

SARAH WILLIAMS

Enforcement of Proposed Station Locations

- The Energy Commission reserves the right to cancel a proposed award or funding agreement if the proposed location of the station becomes unviable for any reason. Funding from terminated agreements may be utilized to fund the next eligible Proposal under this solicitation.

Enforcement of Critical Milestones

- The Energy Commission reserves the right to cancel a proposed award or funding agreement if one or more critical milestones are missed. Funding from terminated agreements may be utilized to fund the next eligible Proposal under this solicitation.
- Critical milestones may include:
  - Grant agreement execution;
  - Permit application submittal(s); and
  - Commencement of station construction.

Break

Kristin Macey

Kevin Schnepp

HYDROGEN QUALITY/PURITY TESTING, DISPENSER TYPE CERTIFICATION, HYSTEP

Dispenser Requirements

- The California Department of Food and Agriculture (CDFA), Division of Measurement Standards (DMS) must certify hydrogen dispensers through the California Type Evaluation Program (CTEP) so hydrogen can be legally sold at retail. To evaluate hydrogen dispensers, field tests are designed to:
  - Determine conformance to one of the adopted accuracy classes specified in regulation.
  - Determine fill-to-fill repeatability, accuracy, and precision.
  - Determine dispenser performance during interrupt and emergency stop simulations.
  - Determine conformance to advertising, labeling, and method of sale requirements.

Field Testing with the Hydrogen Fuel Standard (HFS)

- HFS is driven to hydrogen station, set up, and operating systems validated.
- DMS works with on-site operators and engineers to insure operational safety.
- Fueling protocols and sample drafts are conducted to simulate “live-fill” scenarios.
- Data is collected in real time.
- Accuracy assessment is completed at test cycle end.
- Conformance to CCR Title 4, Div. 9 Section 3.39 Hydrogen Gas Measuring Devices is determined.
- Type evaluation: 3 months and subsequent testing: 1 – 2 days.

Field Testing with the HFS

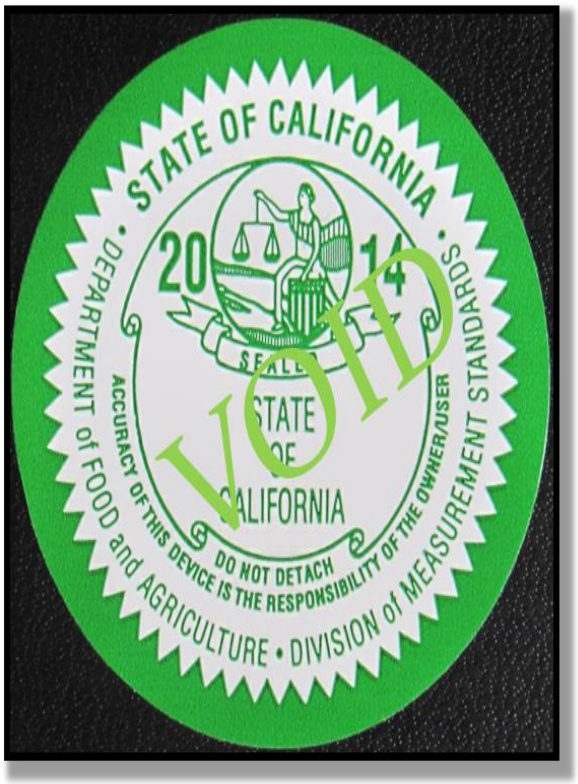
- Test data and inspection notes are compiled and analyzed, and the Compliance/Deficiency Letter is mailed.
- Time for type evaluation: 3 months

California's Expanded Accuracy Classes and Tolerances for Hydrogen Fuel Dispensers

Accuracy Class	Acceptance Tolerance	Maintenance Tolerance
2.0	1.5%	2.0%
3.0 (installed before 2020*)	2.0%	3.0%
5.0 (installed before 2020*)	4.0%	5.0%
10.0 (installed before 2018*)	5.0%	10.0%

* No new installations after the end of the designated calendar year unless regulations are further amended. Existing installations allowed to operate until decommissioned.

Official Seals On Type Approved Dispensers



Method of Sale, Advertising, and Labeling Requirements

- Guidance Document for Retail Sale Advertising of Hydrogen Fuel is available at:

  http://www.cdfa.ca.gov/dms/hydrogenfuel/hydrogenfuel.html

- All provisions specified in CCR Title 4, Division 9, Chapter 1, Article 1, Section 3.39 Hydrogen Gas Measuring Devices apply.

- Conformance to requirements is evaluated during type evaluation process, during initial accuracy assessment of newly installed type-certified dispensers, and any routine/complaint testing.

Hydrogen Fuel Quality

- Chapter 14 of the Business and Professions Code requires the Division of Measurement Standards to establish and enforce quality specifications for transportation fuels in California.

- Quality standards for hydrogen fuel were published in 2011 as SAE International's *Surface Vehicle Standard J2719 - Hydrogen Fuel Quality for Fuel Cell Vehicles*.

- SAE J2719 has been adopted by reference by the Department of Food and Agriculture in California Code of Regulations Title 4, Division 9, Chapter 6, Article 8, Section 4181.

Hydrogen Fuel Quality

- The Division conducts random, routine, and complaint based sampling and testing of fuel quality throughout the state.
- Compliance to all specifications for hydrogen fuel quality identified in SAE J2719 is mandatory.
- Retailers dispensing, selling, or offering to sell hydrogen fuel that is out of conformance with specifications will have the nonconforming product immediately taken off-sale.
- It is a violation of law to refuse access for sampling of fuel offered for sale to the public.

Hydrogen Sampling Apparatus

- Engineered and Constructed by Gas Technology Institute (GTI) with full HAZOPS.
- Fuel sample is collected from the nozzle – each sample is approx. 68 liters at 1000 psi.
- On-site technician required to override system leak detection auto shut-off.
- Total sampling time=approx. 1.5 hrs.
- Full spectrum of tests=approx. 2.5 days.

Hydrogen Fuel Quality Laboratory

Break

Day 2 Wrap-up and Discussion

- Review of workshop discussions,
- Additional comments.

Comments

- Written comments due to the California Energy Commission Dockets Unit by 5:00 p.m. on August 28, 2015
- Include docket number 15 HYD-01 and Draft Solicitation Concepts for Hydrogen Refueling Infrastructure in the subject line:
  - docket@energy.ca.gov

Adjournment